12-16 Row
Twin-Line® PLANTER

OPERATOR & PARTS MANUAL

M0132 Rev. 1/88

This manual is applicable to: Twin-Line®
Model: TW
Serial Number : 30101 And On

Record the model number and serial number of your planter with date purchased:

Model Number _____

Serial Number _____

Date Purchased _____

NEW MACHINE WARRANTY

No warranties express or implied are made or will be deemed to have been made by Kinze of the products sold under this Agreement except as follows:

Kinze warrants to the original purchaser for use, on products sold and located within the boundaries of the U.S. and Canada, that if any part of the product proves to be defective in material or workmanship within one year from date of original purchase, and is reported to Kinze within 10 days after such defect is discovered, Kinze will (at our option) either replace or repair said part. Return of the defective part to Kinze and submission of a completed warranty request must be accomplished within 30 days of the date that the replacement is made available.

This warranty does not apply to damage resulting from alteration, misuse, neglect, accident or improper installation or maintenance. A part will not be considered defective if it substantially fulfills performance specifications. Labor, shipping, field service, travel or administrative expenses incurred in connection with warranty replacements are not covered. Tires are not warranted by Kinze Manufacturing, Inc. and such claims must be pursued through the tire manufacturer's warranty.

Kinze warrants all replacement parts for a period of 90 days from date of purchase by the customer. Parts warranty is subject to the same provisions, restrictions and exclusions as new machine warranty and carries the same return and reporting requirements.

The foregoing warranty is exclusive and in lieu of all other warranties of merchantability, fitness for purpose and of any other type, whether express or implied. Kinze neither assumes nor authorizes anyone to assume for it any other obligation or liability other than stated above, and will not be liable for consequential damages. Purchaser accepts these terms and warranty limitations unless the product is returned within the fifteen days for full refund of purchase price.

Kinze reserves the right to make changes or to add improvements at any time without notice or obligations.

W12187

TABLE OF CONTENTS

To The Owner 1-1

New Machine Warranty 1-1

Introduction 2-1
- General Information 2-1
- Serial Number 2-1

Safety Precautions 3-1

Safety Warning Signs 4-1, 4-2

Operation
- Initial Preparation Of The Planter 5-1
- Tractor Preparation and Hookup 5-1
- Leveling The Planter 5-1
- Tire Pressure 5-1
- Transmission Adjustment 5-2
- Contact Drive Wheel Spring Adjustment 5-2
- Shear Protection 5-2
- Hydraulic Operation 5-2/5-8
  - Valve Block Located On Main Frame 5-3
  - Valve Block Located On Hitch 5-3
  - Tongue Lock Operation 5-3
  - Marker Operation 5-4
  - Planter Lift System Operation 5-4
    - Raised Field Position 5-5
    - Raised Transport Position 5-5
  - Transport To Plant Operation Procedure 5-5
  - Plant To Transport Operation Procedure 5-6
- Point Row Clutch Operation 5-8
- Ridge Planting 5-9
- Manual Safety Lockup 5-9
- Marker Adjustment 5-9
- Transporting The Planter 5-10
- Tractor Speed 5-10
- Field Test 5-10
- Fertilizer Opener 5-10
- Dry Fertilizer Attachment 5-11
- Liquid Fertilizer Attachment 5-12
- Planting Rates For Plateless Corn Meters 5-13
- Planting Rates For Plateless Soybean Meters 5-14/5-17
- Planting Rates For Plateless Intermediate Rate Sorghum Meters 5-18
- Planting Rates For Plateless Low Rate Sorghum Meters 5-19
- Dry Insecticide Application Rates 5-20
- Dry Herbicide Application Rates 5-21
- Dry Fertilizer Application Rates 5-22
- Liquid Fertilizer Application Rates 5-23

Lubrication
- Sealed Bearings 6-1
- Drive Chain 6-1
- Wheel Bearings 6-1
- Lubrication Chart 6-1/6-4

Maintenance
- Mounting Bolts And Hardware 7-1
- Chain Tension Adjustment 7-1
- Solenoid Valve Inspection 7-2
  - Trouble Shooting Chart 7-2
- Flow Control Valve Inspection 7-2
- Pressure Relief Valve Inspection 7-2
- Wheel Or Marker Bearing Lubrication Or Replacement 7-3
- Preparation For Storage 7-3
- Wiring Diagram 7-4

TABLE OF CONTENTS

Assembly
- Hardware 8-1
- Torque Values Chart 8-1
- Row Unit Assembly 8-1
- Push Unit Attachment Assembly 8-1/8-7
- Extended Drill Sprocket Package Assembly 8-7/8-8
- Dry Fertilizer Attachment Assembly 8-9/8-14
- Liquid Fertilizer Attachment Assembly 8-14/8-19
- Final Inspection 8-19

Parts List Index P1

Part Section Numerical Index ..... a

TO THE OWNER

We at Kinze Manufacturing wish to thank you for your patronage and appreciate your confidence in Kinze farm machinery. Your Kinze planter has been carefully designed and sturdily built to provide years of dependable operation in return for your investment.

This manual has been prepared to aid you in the assembly, operation, and maintenance of the planter. Do not use or operate this equipment until this manual has been read and understood.

Throughout this manual the symbol ⚠ and the words **Note, Caution and Warning** are used to call your attention to important safety information. The definition of each of these terms used follows:

NOTE: Indicates a special point of information.

CAUTION: Indicates that a failure to observe can cause damage to the machine or equipment.

⚠ **WARNING:** Indicates that a failure to observe can cause damage to equipment and/or personal injury.

This manual is applicable to:

Twin-Line Planter
Model Number TL
Serial Number 30101 and on

Record the model number and serial number of your planter with date purchased:

Date Purchased _____

Serial Number _____

Model Number _____

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No warranties express or implied are made or will be deemed to have been made by Kinze of the products sold under this Agreement except as follows:

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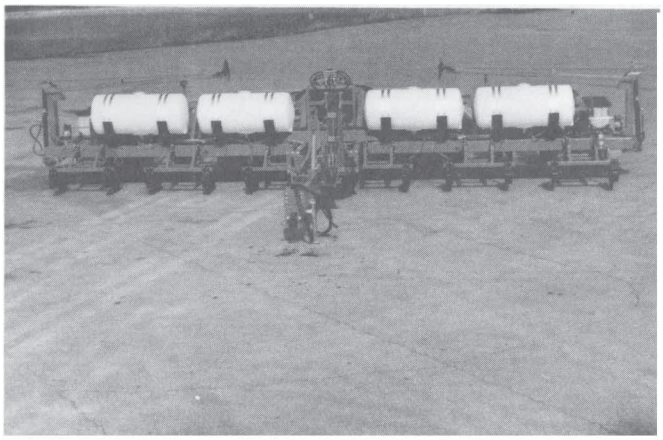
Kinze reserves the right to make changes or to add improvements at any time without notice or obligations.

ATTENTION: Effective 12/1/87 amendments were made to the KINZE New Machine Warranty. Refer to insert W12187.

INTRODUCTION

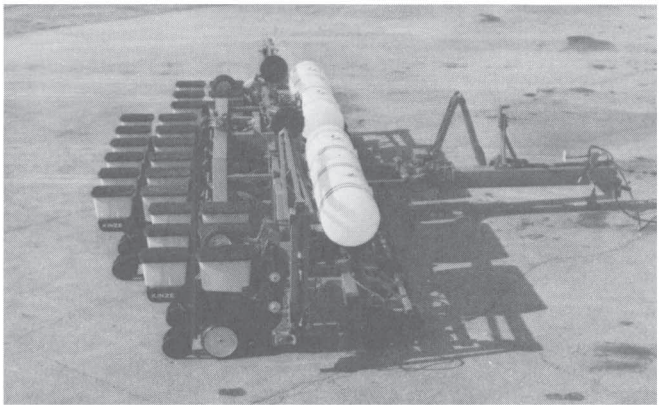
The Twin-Line planter is available in various configurations with a choice of 38", 36" or 30" row spacing. Optional interplant row spacing of 19", 18" or 15" are obtainable with the addition of pusher type row units.

The Twin-Line planter permits installation of liquid or dry fertilizer application equipment and 1" or 2" no-till coulters. For further information on installation and use of optional equipment on all models, refer to the Assembly and Operation Sections of this manual and your Kinze Row Unit Manual.



GENERAL INFORMATION

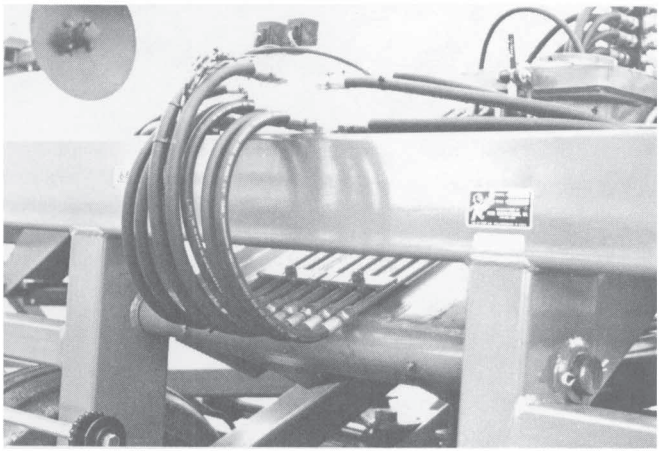
The information and photos used in this manual were current at the time of printing. However, due to Kinze's continual attempt to improve its product, possible in-line production changes may cause your machine to appear slightly different in detail. Kinze Manufacturing reserves the right to change specifications or design without notice and without incurring obligation to install the same on machines previously manufactured.



Right hand or left hand as used throughout this manual is determined by facing in the direction the machine will travel when in use unless otherwise stated.

SERIAL NUMBER

The serial number plate is located on the planter frame to be readily available. It is suggested that the serial number and purchase date also be recorded in the space provided on the inside front cover page of this manual.



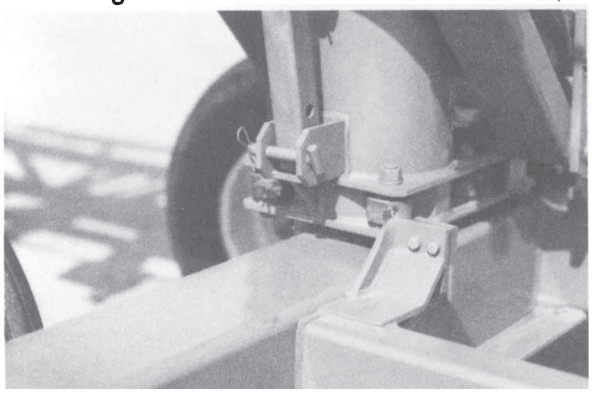
The serial number provides important information about your planter and may be required to obtain the correct replacement part. Always provide the serial number and model number to your Kinze dealer when ordering parts or anytime correspondence is made with Kinze Manufacturing.

SAFETY PRECAUTIONS ⚠

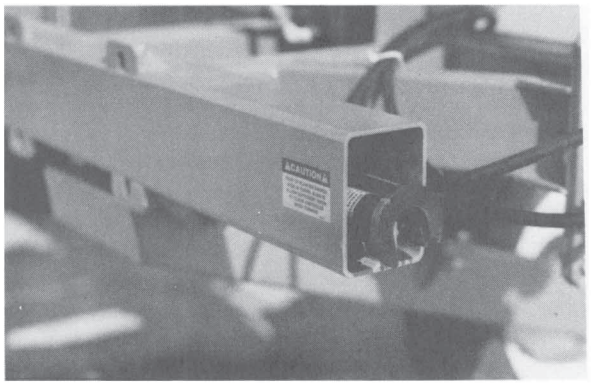
Safe and careful operation of the tractor and planter at all times will contribute significantly to the prevention of accidents.

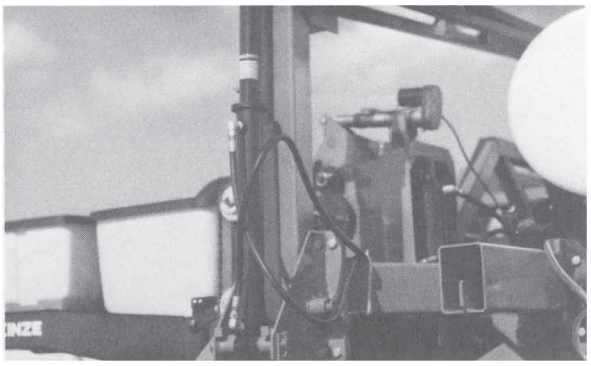
Since a large portion of farm accidents occur as a result of fatigue or carelessness, safety practices should be of utmost concern. Read and understand the instructions provided in this manual as well as those provided in your Kinze Row Unit Operator's Manual. Listed below are a few other safety suggestions that should become common practice.

- Never permit any persons other than the operator to ride on the tractor.
- Never ride on the planter frame or allow others to do so.
- Limit towing speeds to 15 MPH. Tow only with farm tractor.
- Always make sure there are no persons near the planter when marker assemblies are in operation or when rotating the planter.
- Always lower the planter when not in use and cycle the hydraulic control lever to relieve pressure in cylinders and hoses.
- Always make necessary safety preparations prior to transporting the machine on public roads. This includes installing Slow Moving Vehicle (SMV) emblem and use of adequate lights or safety warnings after dark, except where prohibited by law.
- Watch for obstructions such as wires, tree limbs, etc., when folding markers.
- Rear of planter swings wide in turns. Always allow sufficient room to clear obstacles when turning.



- Never work under the planter while in raised position without using manual safety lockup.
- Avoid transporting planter with hoppers loaded whenever possible. When it is necessary to transport the planter with the hoppers loaded, the added weight should be distributed evenly on the planter frame before rotating the planter.
- Never allow the planter to be operated by anyone who is unfamiliar with the operation of all functions of the unit. All operators should read and thoroughly understand the instructions given in this manual prior to moving the unit.



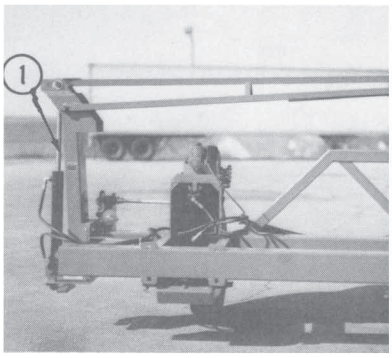


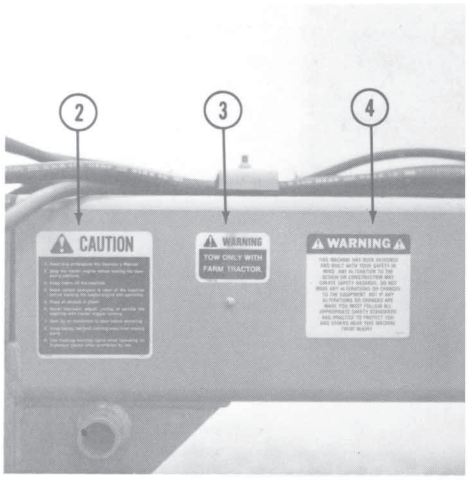
- Install lockup brackets on markers prior to towing the planter or working around the unit.
- This planter is designed to be DRIVEN BY GROUND TIRES ONLY. The use of hydraulic, electric or PTO drives may create serious safety hazards to you and the people near by. If you install such drives you must follow all appropriate safety standards and practices to protect you and others near this planter from injury.
- This machine has been designed and built with your safety in mind. Any alteration to the design or construction may create safety hazards. Do not make any alterations or changes to the equipment, but if any alterations or changes are made you must follow all appropriate safety standards and practices to protect you and others near this machine from injury.

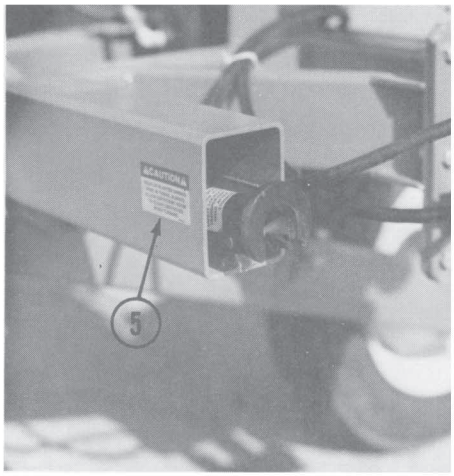
SAFETY WARNING SIGNS ⚠

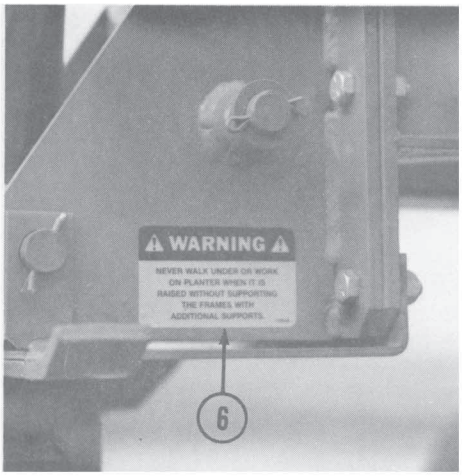
The "WARNING" signs illustrated on this page are placed on the machine to warn of hazards. "The warnings found on these signs are for your personal safety and those around you." OBSERVE THESE WARNINGS!

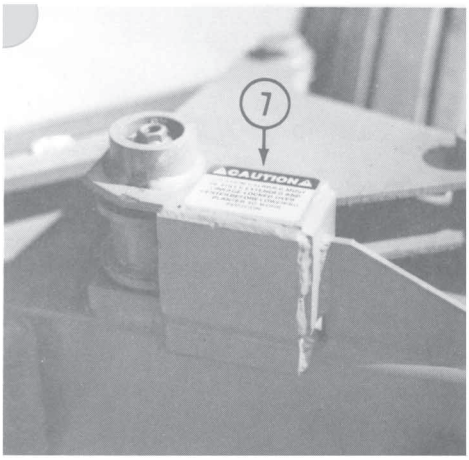
- Keep these signs clean so they can be observed readily. Wash with soap and water or cleaning solution as required.
- Replace "WARNING" signs should they become damaged, painted over or if they are missing.
- When replacing decals, clean the machine surface thoroughly using soap and water or cleaning solution to remove all dirt and grease.

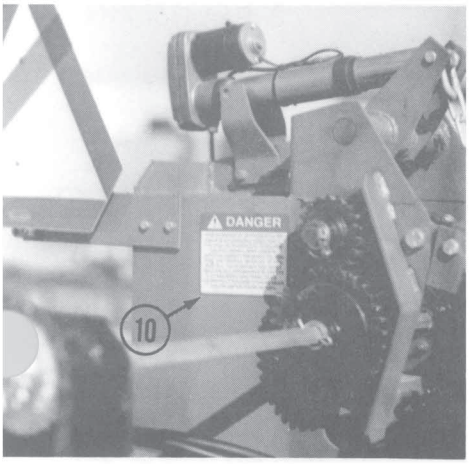


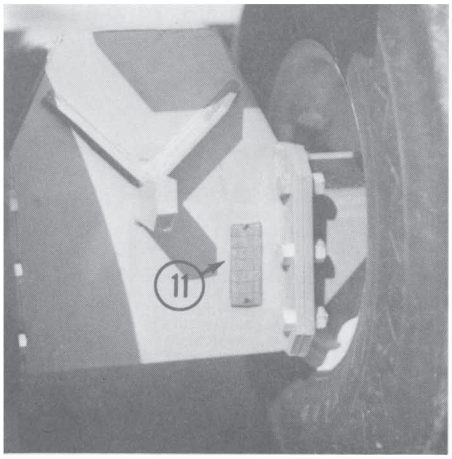


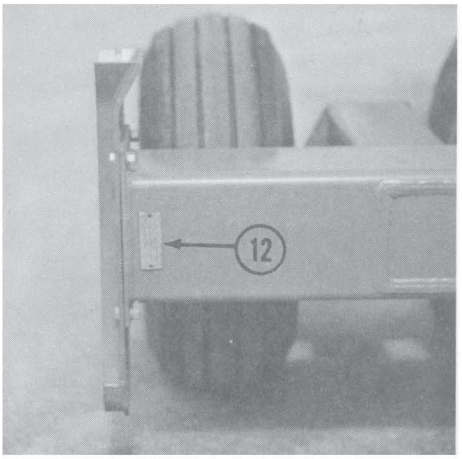






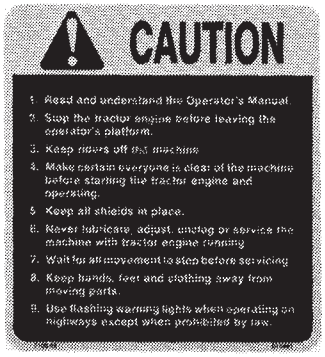






SAFETY WARNING SIGNS

1. Part No. 7100-42



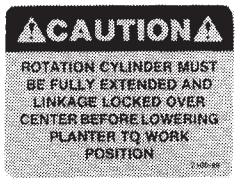
2. Part No. 7100-46

3. Part No. 7100-56

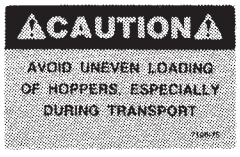
4. Part No. 7100-90

5. Part No. 7100-63

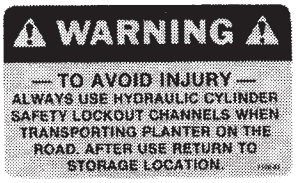
6. Part No. 7100-68



7. Part No. 7100-69

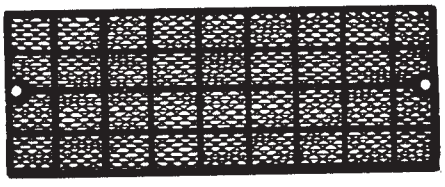


8. Part No. 7100-75



9. Part No. 7100-83

10. Part No. 7100-89



11. Part No. 7200-3 Red
12. Part No. 7200-4 Amber

OPERATION

The following information is general in nature and was written to aid the operator in preparation of the tractor and planter for use, and to provide general operating procedures. The operator's experience, familiarity with the machine and the following information should combine for efficient planter operation and good working habits. The operator's manual for the row units used with your Kinze planter should also be readily available and consulted for planter operation.

INITIAL PREPARATION OF THE PLANTER

Lubricate the planter and row units per the lubrication information in this manual and the row unit operator's manual. Make sure all tires have been properly inflated. Check all drive chains for proper tension and lubrication.

TRACTOR PREPARATION AND HOOKUP

1. Adjust tractor drawbar so that it is 13 to 17 inches above the ground. Then adjust the drawbar so that the hitch pin hole is directly below the center line of the PTO shaft. Make sure the drawbar is in a stationary position.

2. Back tractor to planter and connect with hitch pin. Make sure hitch pin is secured with locking pin or cotter pin.

3. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.

⚠ WARNING: Before applying pressure to the hydraulic system, make sure all connections are tight and that hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin, causing injury or infection.

CAUTION: Always wipe hose ends to remove any dirt before connecting couplers to tractor ports.

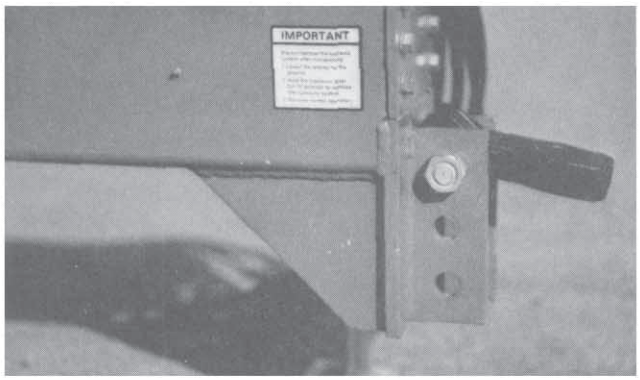
4. Ensure electrical control harness is securely connected.

5. Raise jack stand and remount horizontally on storage bracket.

6. Lower planter to the planting position and check hitch for levelness. If hitch slopes up or down, disconnect planter and adjust hitch clevis up or down as necessary.

LEVELING THE PLANTER

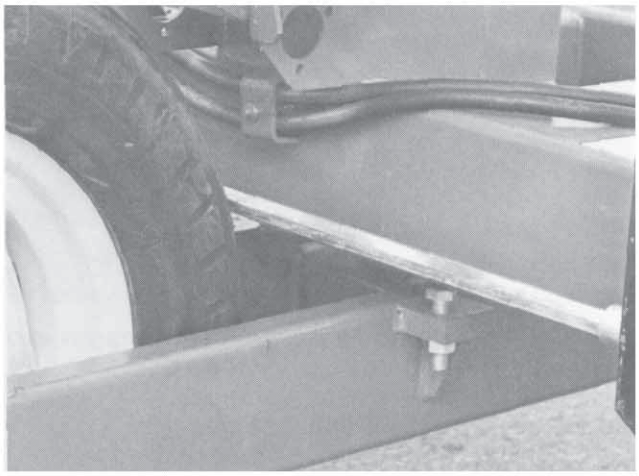
For proper operation of the planter and row units, it is important that the unit operate level.



Three holes in the hitch bracket allow the clevis to be raised or lowered. In addition, the clevis may be turned over for a finer adjustment between mounting holes. When installing clevis mounting bolt, make sure lock nut is tightened to proper torque setting.

Always check fore and aft levelness with the planter lowered to proper operating depth. Then sight across hitch or place a bubble level on the hitch and frame.

In order to maintain lateral levelness, it is important that tire pressure be maintained at pressures specified. Adjusting bolts on each drive wheel module on 12 row and larger models also allows for additional adjustment for leveling the wings.



TIRE PRESSURE

Tire pressure should be checked regularly and maintained as follows:

14L x 16.1, Transport - 40 PSI
7.50 x 20, Ground Drive Gauge - 40 PSI
4.8 x 8, Contact Drive - 50 PSI

IMPORTANT: Tire pressure must be correctly maintained in all drive wheel tires to insure level and proper operation of planter. Also all rate charts are based on the above tire pressure specifications

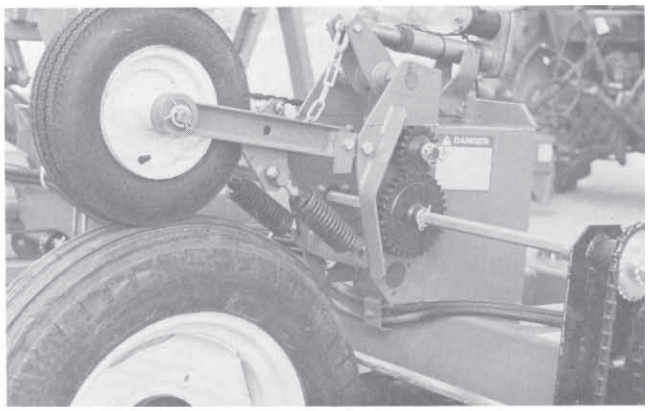
TRANSMISSION ADJUSTMENT

The transmission is designed to allow simple rapid changes in sprocket combination to obtain the desired planting population. Since both the transmission drive shaft and row unit drive shaft are hexagonal in shape, the sprockets need only be slid into alignment with the idlers after first removing the lynch pins. A combination of small sprockets may require shortening the drive chain.

A decal positioned next to the transmission provides proper chain routing. The planting rate charts found in the Operation Section of this manual will aid you in selecting the correct sprocket combinations. After positioning both sprockets, replace the lynch pins. Then restore tension on the drive chain.

IMPORTANT: After each sprocket combination adjustment, make field check to be sure you are planting at the desired rate.

CONTACT DRIVE WHEEL SPRING ADJUSTMENT

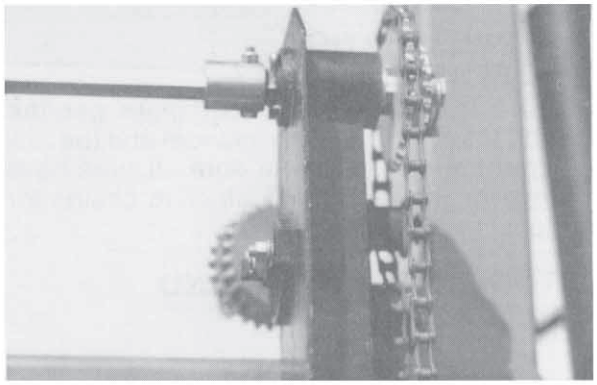


There are two down pressure springs on each contact drive wheel. Spring tension can be adjusted by tightening or loosening the 1/2" x 3" cap screw draw bolt. Adjustment dimension given is between the bolt head and the rear edge of the spring plug. Under normal conditions adjust draw bolt to 2 inches. Do not tighten the draw bolt to less than 1 1/2". Always check to see that the point row actuator will lift the contact drive wheel after adjustments have been made. On the 16 row model with two contact drive wheels on each wing over tightening the down pressure springs will not allow the actuator to raise the contact wheels for point row usage.

SHEAR PROTECTION

The planter drive line and row unit and fertilizer components are protected from damage by shear pins.

If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin.



CAUTION: In the top coupler on each transmission assembly a 5/16", grade 2, cap screw is used and in the bottom coupler on each transmission assembly a 1/4" cotter pin is used. Never replace this hardware with any other size or grade hardware.

To prevent future binding or breakage of components, follow prescribed lubrication schedules.

Be sure universal joints on drives are in time.

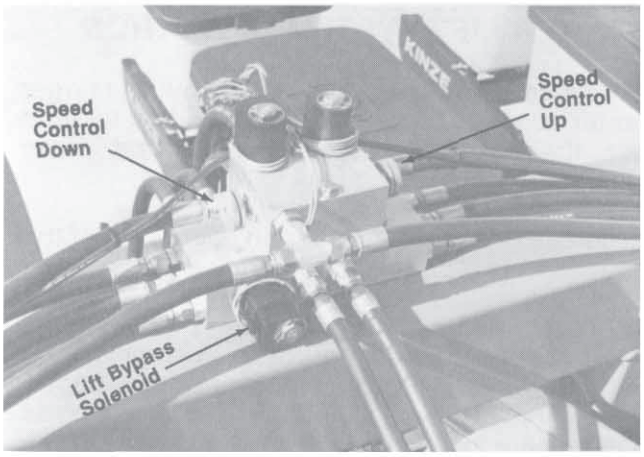
HYDRAULIC OPERATION

All Twin-Line planters are equipped for a triple valve hydraulic system.

One set of outlets is used to raise and lower the planter, one set is used to operate the markers and one set in conjunction with the electric control panel is used to operate the rotate to transport functions.

⚠ **WARNING:** Make sure all hydraulic hoses are properly connected before operating the planter. Never connect or disconnect hydraulic hoses without first stopping the tractor engine and moving the hydraulic operating levers in both directions to relieve any pressure in the system.

NOTE: To purge air from the hydraulic hoses, lower the planter to the planting position and hold the tractor hydraulic control lever in that position until the cylinders are fully retracted. Tractor reservoir should be sufficiently full of hydraulic fluid.



VALVE BLOCK LOCATED ON MAIN FRAME

The valve block assembly located on the main frame of the planter just behind the pivot assembly is made up of the marker solenoids and flow controls and the lift bypass solenoid.

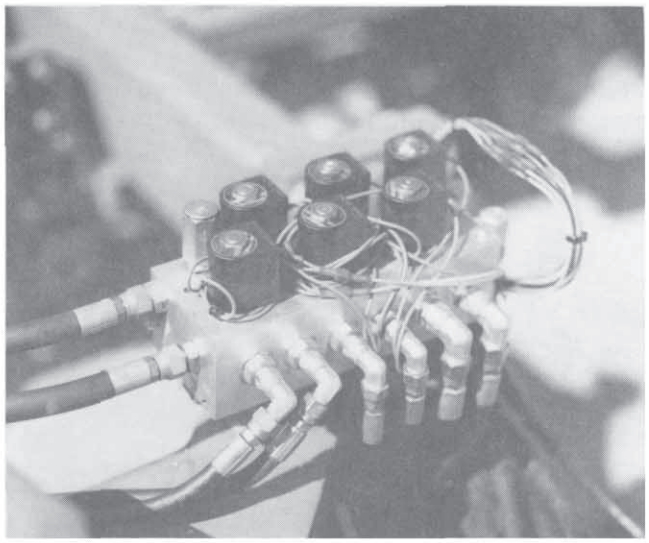
The two solenoids on the top control which marker will operate when the tractor hydraulic lever is moved. (See marker operation.)

The speed at which the markers will travel is controlled by the knurled adjustment knob or flow control on the side of the valve block. The knob on the right side of the block will control the speed of the marker coming down. The knob on the left side of the block will control the speed of the marker coming up. Screw the knobs all the way in and turn back out about 1 1/2 turn and check marker speed. Travel time should be approximately 6 seconds. To increase speed of the marker turn the knob out. To decrease the speed of the marker turn the knob in. Temperature of the hydraulic oil will effect the marker speed so an additional adjustment may be necessary. Once marker adjustment has been made, tighten the knurled lock nut against the valve block.

The solenoid valve located on the front side of the block is used in conjunction with the planter lift system when the planter is being raised to transport position. (See planter lift system operation.)

VALVE BLOCK LOCATED ON HITCH

The valve block assembly located on the hitch of the planter is made up of three pairs of solenoid valves. Each pair is controlled by a momentary contact selector switch on the planter control panel on the tractor. One pair allows the operator to hydraulically lock the wings rigid on 12 row and larger planters. One pair rotates the planter to the transport or plant position and one pair extends the planter tongue. The switch must be held in contact when operated. (See planter operation procedures.)

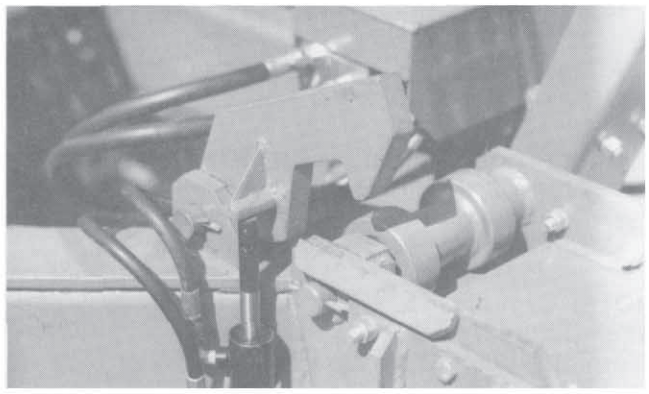


NOTE: These solenoids operate in pairs.

The pressure relief valve is also located on this valve block. (See tongue lock operation.)

CAUTION: Valve block shown with cover removed for illustration purposes only. Cover should always be installed except for service.

TONGUE LOCK OPERATION

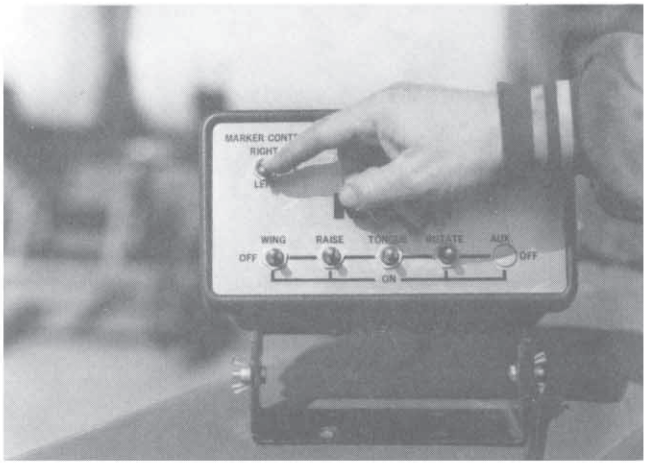


A tongue lock is located on the right side of the tongue. The purpose of the lock is to take pressure off the tongue cylinder and to lock the tongue into the planting position. The lock must release before the tongue will extend. This is accomplished when the 1 1/2" x 2" lift lock cylinder raises the lock. A pressure relief valve located on top of the aluminum valve block on the tongue will not allow hydraulic oil to the tongue cylinder until 1000 PSI of oil pressure is developed at the latch cylinder. This insures that the latch will release first.

The relief valve pressure setting can be adjusted after first unscrewing and removing the cap on top of the valve. Using an allen wrench turn the valve in to increase pressure and out to decrease pressure. The valve is preset at 1000 PSI and should be operated at that setting.

MARKER OPERATION

Two solenoid valves along with a three position selector switch permits the operator to raise or lower the desired marker.



1. On the control panel select which marker you want lowered.
2. Operate hydraulic control lever to lower marker.
3. If opposite marker is to be used next, flip control switch to other side.
4. At end of field, using hydraulic control lever raise the down marker.
5. After making the turn, using the hydraulic lever lower the preselected marker.
6. Continue to follow this procedure.

NOTE: Switch should be left in "off" position when planter is not in use. If left in "on" position overnight it will drain the tractor battery.

If the electrical system fails to operate properly:

Check fuse
Check wiring connections
Check control switch
Check solenoid - Solenoid housing will be magnetized when energized.

PLANTER LIFT SYSTEM OPERATION

The planter lift system on the 12 row and larger planter consists of two master cylinders located near the center of the machine and slave cylinders on the outer wings.

There is one slave cylinder on each wing of the 12 row and two on the 16 row.

With the master/slave hydraulic lift system, oil is forced into the butt end of the center master cylinders when the hydraulic lever on the tractor is moved to the raise position. As the master cylinders are extended, oil from the rod end of the master cylinders is forced into the butt end of the slave cylinders on the planters wings.

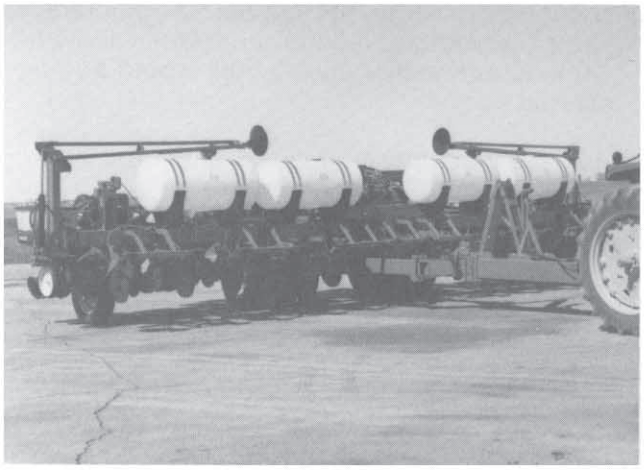
The bore of each master cylinder is equal to the total bore of the slave cylinders on each wing and since the two center master cylinders are tied together in a common lift assembly, the wings and center frame will raise and lower at the same rate keeping the planter level.

The master/slave lift system on the Twin-Line is unique in that the center master cylinders have more stroke than the slave cylinders. The masters have a twenty inch stroke and the slaves have an eight inch stroke.

The slave cylinders are provided with a bypass port which will allow oil to bypass the cylinder piston. If the system gets out of phase the system can be rephased by holding the tractor hydraulic lever at the end of the cylinder stroke until all the cylinders are fully extended or retracted. This will generally take 15 to 20 seconds.

The bypass on the raised or extended end of each wing cylinder is controlled by an electric solenoid valve which is located on the main frame valve block and is controlled with the control switch located on the planter control console. This switch is marked "raise".

Raised Field Position



There are two raised positions on the planter. One is the raised field position which is when the planter wing cylinders are fully extended and the master cylinders in the center are at half their stroke, but because the bypass solenoid is not energized the wing cylinder can not bypass oil preventing the planter from raising any higher. This position will raise the row units approximately 20 inches off the ground. This position is used in making turns or passing over waterways during the field operation.

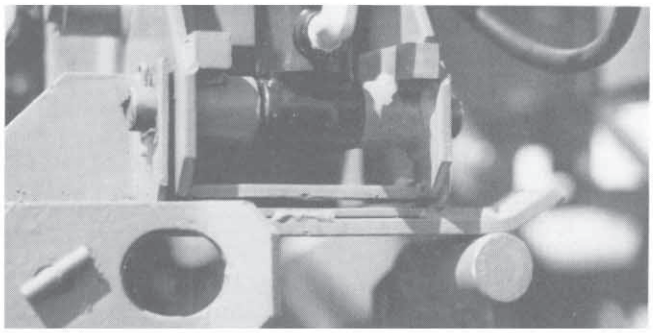
Raised Transport Position

The other raise position is the raised transport position. Here the planter must be raised high enough so that the row units will clear the transport wheels when the planter is rotated. To do this the planter is first raised to raised field position and the wings locked in the rigid position. (See "Transport Operation" procedures.) By holding down the "raise" switch on the control console to energize the bypass solenoid and holding the tractor hydraulic lever in the raise position the planter will continue to raise until the master cylinders are fully extended. At this point an automatic safety lock will lock the planter in the raised transport position.

NOTE: Anytime the planter is raised beyond the raised field position the bypass solenoid must be energized to allow oil to bypass around the pistons in the wing lift cylinders. The planter will also lift at a slower rate because of the restriction of the bypass. Also once the planter is lowered from the raised transport position the planter must be completely lowered to the ground and the hydraulic lever on the tractor held until all cylinders are fully retracted and the system is rephased.

TRANSPORT TO PLANT OPERATION PROCEDURE

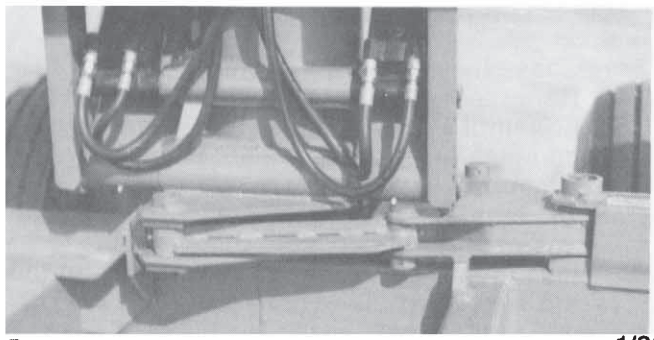
1. Release transport latch.
   A. Press "tongue" switch and hold.
   B. Engage hydraulic lever until tongue is retracted approximately 1" or only far enough to release latch.



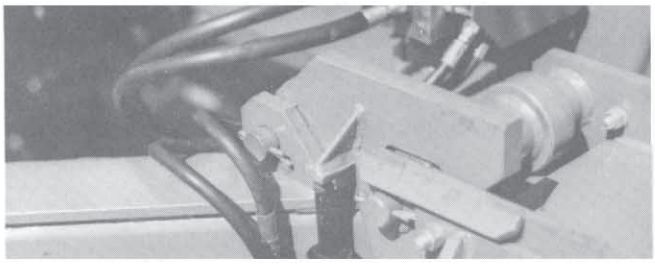
CAUTION: Retracting tongue too far at this point can cause the latch post on the tongue to strike attachments on the front tool bar or the hose takeup on the tongue to strike the main frame.

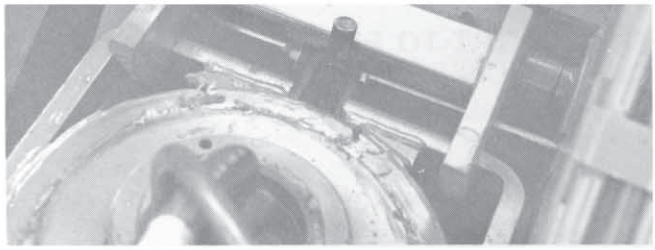
CAUTION: If tongue is retracted too far and drops off of the latch ramp, do not attempt to extend tongue until after rotating the planter frame away from the latch post. Latch post would catch on latch ramp and result in damage to the latch post.

2. Rotate planter to field position.
   A. Press "rotate" switch and hold.
   B. Engage and hold hydraulic lever until rotation cylinder is fully extended and rotation toggle is locked over center.



3. Retract tongue.
   A. Press "tongue" switch and hold.
   B. Engage and hold hydraulic lever until tongue is fully retracted and tongue lock hook drops into place.





4. Release automatic safety lift lock.
   A. Engage and hold hydraulic lift lever in down position momentarily to allow safety lock release cylinder to move into release position.
   B. Engage hydraulic lift lever to raise planter and allow release cylinder to release safety lock.

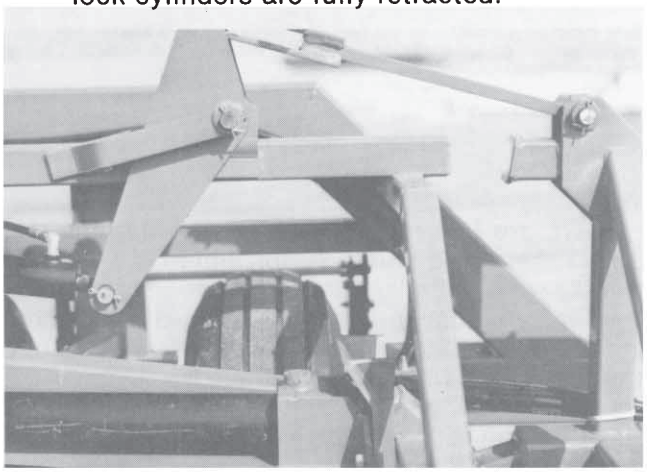
NOTE: It may be necessary to hold "raise" switch down to allow the planter to raise high enough to release the lock. Release of the automatic safety lock can be observed from the tractor seat.

IMPORTANT: To prevent damage to the frame, units or tires, make sure the frame has been completely rotated so that the cams on the center section are tracking properly in the guides on the axle and pivot assembly.

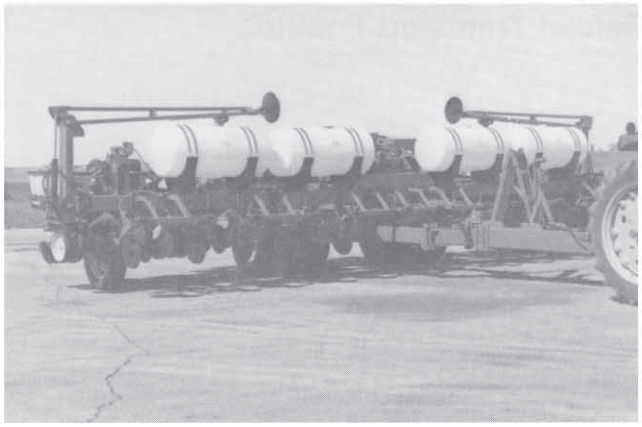
5. Rephase hydraulic lift system.
   A. Hold the hydraulic lever in the down position until the master/slave cylinders are completely retracted. This can take several seconds.
   B. Once the main frame of the planter is down against the tongue, hold the hydraulic lever down for a few more seconds to ensure the system is completely rephased.

NOTE: In the planting position the frame should be down on the tongue. On planters equipped with push units the frame will come back up approximately 1". This would be considered normal.

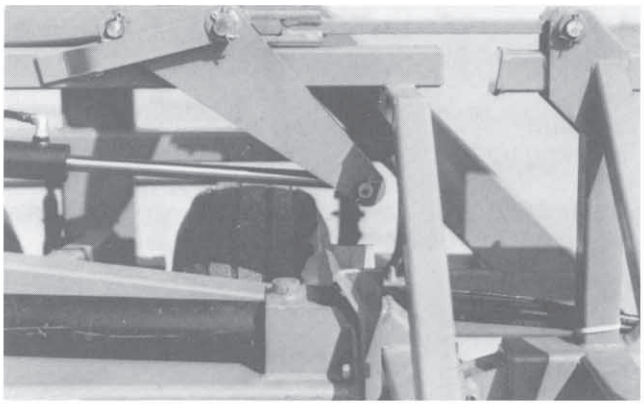
6. Release wing locks so wings may flex.
   A. Press "wing" switch and hold.
   B. Engage and hold hydraulic lever until wing lock cylinders are fully retracted.



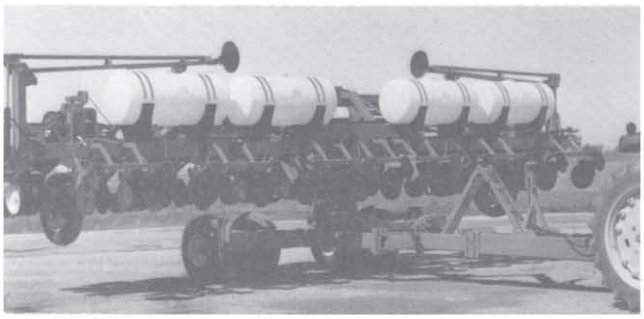
PLANT TO TRANSPORT OPERATION PROCEDURE



1. Raise planter to raised field position.

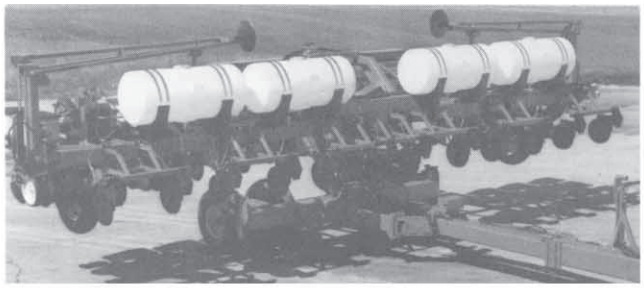


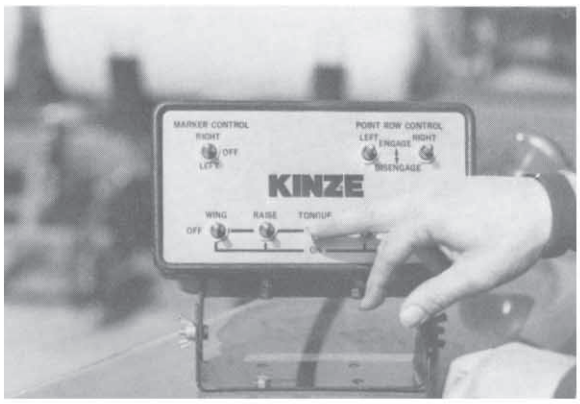
2. Lock wings in transport position.
   A. Press "wing" switch down and hold.
   B. Engage hydraulic lever until wing lock cylinders are fully extended and wing locks are locked over center.



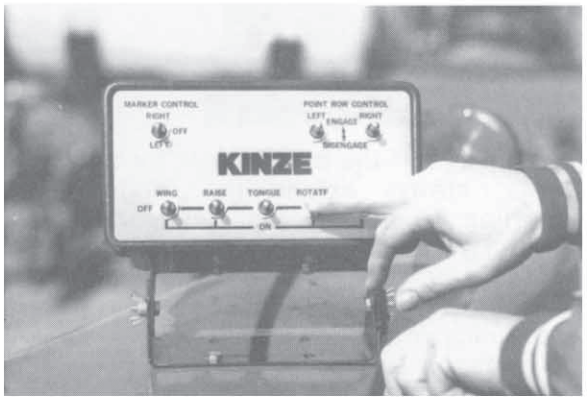
3. Raise planter to transport position.
   A. Press "raise" switch down and hold.
   B. Engage hydraulic lever until master cylinders are fully extended and the automatic safety lock is secured.

   NOTE: Engagement of the safety lift lock can be observed from the tractor seat. Engagement can also be checked by attempting to lower the planter and if the planter will not lower the lock is secured.

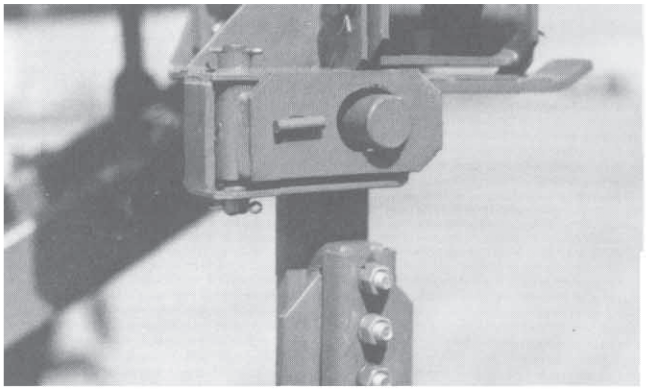




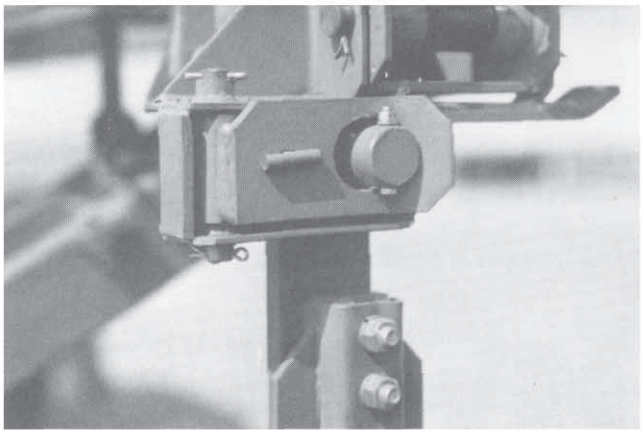
4. Extend tongue.
   A. Press "tongue" switch down and hold.
   B. Engage hydraulic lever until tongue is fully extended.



5. Rotate frame.
   A. Press "rotate" switch and hold.
   B. Engage hydraulic lever to rotate the planter until the transport latch is secured.



NOTE: Resistance of the wing drive gauge wheel against the tongue may prevent the transport lock from engaging. Should this occur, attempting to lower the planter will take hydraulic pressure off the gauge wheel cylinder allowing the wheel to raise slightly and the transport latch to engage.

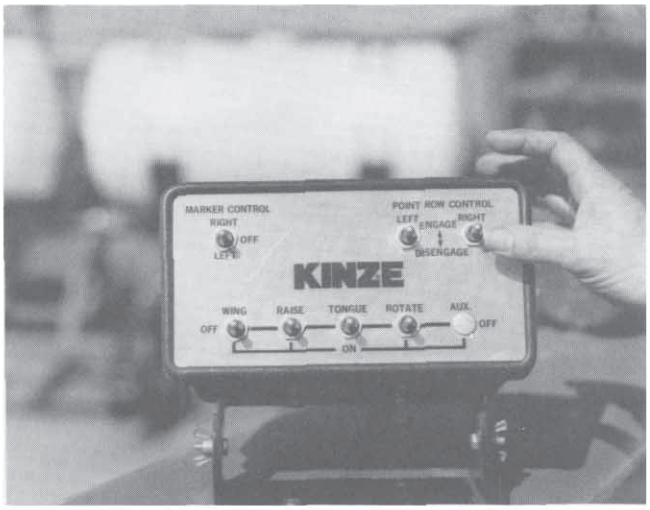


WARNING: If the planter sets for a period of time, always extend the tongue before transporting to ensure the transport latch is secured. Hydraulic pressure can leak off and allow the latch to release. If the planter is transported without being connected to the tractor hydraulics, install a 3/8" x 2 1/2" cap screw into the transport latch post on the hitch.

Also use the manual safety lockup located on the back side of the center pivot assembly.

POINT ROW CLUTCH OPERATION

With the Twin-Line planter you have the capability to shut off either half of the planter for finishing up fields or for long point row situations. This is done with the use of electric actuators which will lift the contact drive wheel off the drive gauge wheel located on the planter wing.



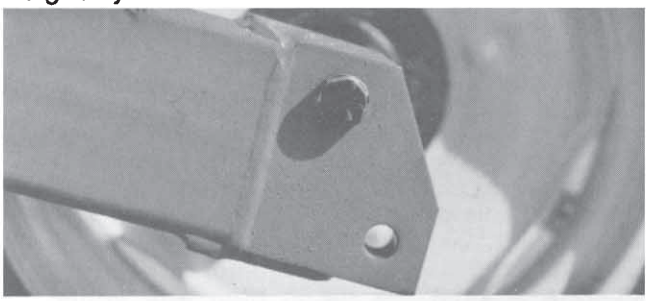
The operational switches for the actuators are located on the planter control panel on the tractor. The switch must be held until the actuator has reached the end of its stroke which will be approximately ten seconds.

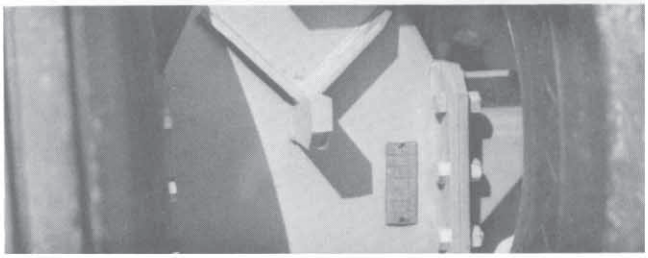
CAUTION: Do not operate both switches at the same time. Doing so will overload the fuse on the control panel and cause it to blow.

The actuator has a built-in slip clutch which is activated at the end of each full stroke to protect the actuator should the switch be held on after reaching full stroke. This will be indicated by a clicking sound. This slip clutch will also protect the actuator if it is overloaded. This overload situation can occur if the down pressure springs on a planter with more than one drive wheel on each wing are too tight.

RIDGE PLANTING

When ridge planting the gauge wheels and transport wheels can be lowered 4". On the gauge wheels drop the wheel to the lower mounting holes and on the transport wheels turn the spindle bracket around. This will increase the planter bar height by 4".



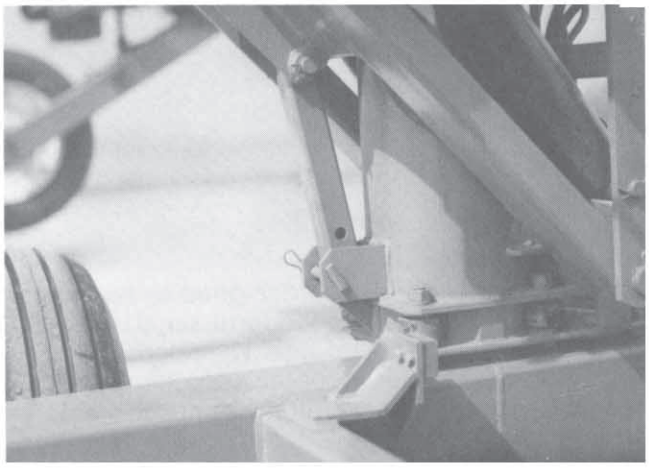


NOTE: Photos show gauge wheel and transport wheel mounted in standard position.

A special latch post is required for use in this application because the planter frame cannot be rotated as far with the gauge wheels in the lower position.

MANUAL SAFETY LOCKUP

The manual safety lockup located on the back side of the center pivot assembly is an added safety device. Never allow anyone to work around or under the planter without first securing the manual safety lock in the locked position. If transporting the planter over long distances use the manual safety lockup for added safety.



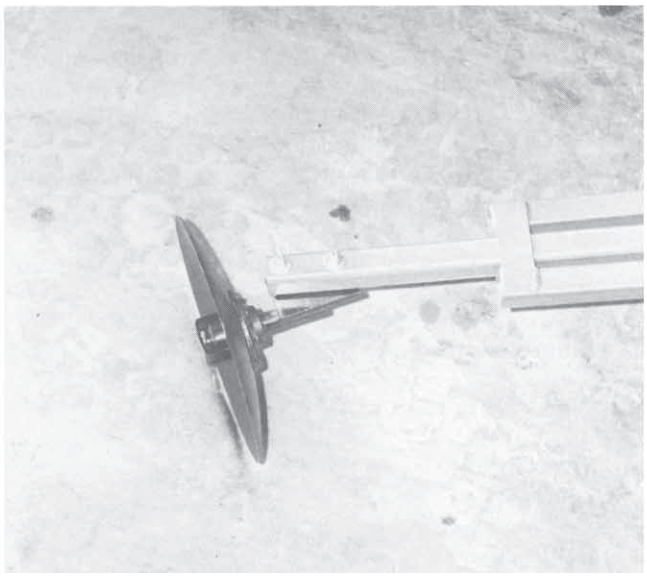
For normal operation remove the tee pin and swing the lockup up into storage position and secure with the tee pin.

MARKER ADJUSTMENT

To determine the correct length at which to set the marker assemblies, multiply the number of rows by the row spacing in inches. This provides the total planting width. Then adjust the marker extension so that the distance from the marker blade to the center line of the planter is equal to the total planting width previously obtained. Both the planter and marker assembly should be lowered to the ground when measurements are being taken. Also, the measurement should be taken from the point where the blade contacts the ground. Adjust right and left marker assemblies equally and securely tighten clamping bolts. An example of marker length adjustment follows:

Number of Rows	X	Row Spacing (Inches)	=	Dimension between planter center line and marker blade

12 x 30" = 360" Marker Dimension



The marker blade is installed so the concave side of the blade is outward to throw dirt away from the grease seals. The spindle bracket is slotted so the hub and blade can be angled forward or rearward to throw more or less dirt. To adjust the hub and spindle, loosen the ½" x 3½" capscrews and move the bracket as required. Then tighten bolts to the specified torque.

We recommend a field test be made to ensure the markers are properly adjusted. After the field test is made, make any minor adjustments necessary.

TRANSPORTING THE PLANTER

⚠ WARNING: Always make necessary safety preparations prior to transporting the planter on public roads. This includes installing Slow Moving Vehicle (SMV) emblem and use of adequate lights or safety warning after dark.

CAUTION: Avoid transporting planter with hoppers loaded whenever possible. When it is necessary to transport the planter with the hoppers loaded, the added weight should be distributed evenly on the planter frame before rotating the planter.

TRACTOR SPEED

Planters are designed to operate within a speed range of 2 to 8 M.P.H. Variations in ground speed will produce variations in rates. Corn meter populations will tend to be disproportionately higher at high ground speeds. While soybean and sorghum seed cup populations will tend to be disproportionately lower.

FIELD TEST

We recommend a field test be made to ensure proper seed placement and operation of row units. See Rate Charts at end of this section.

Also check for any marker adjustment that may be needed.

After the planter has been field tested, re-inspect the unit.

☐ Hoses - Fittings

☐ Bolts - Nuts

☐ Drive Chains

FERTILIZER OPENER

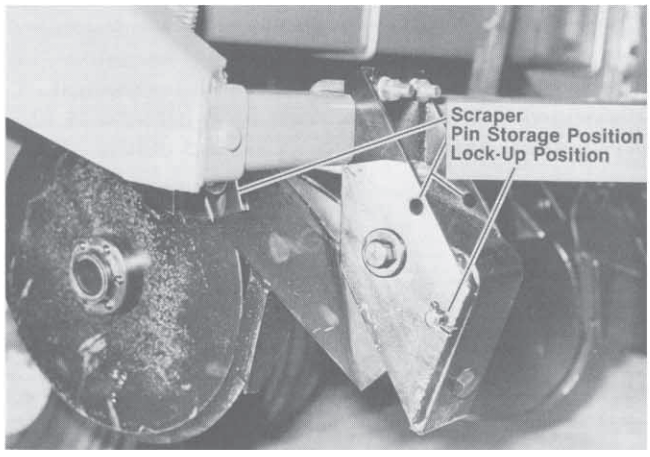
The double disc fertilizer openers should be positioned during assembly to place the fertilizer **no closer than 2" to either side of the row.** If planter frame is level, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

The down pressure springs are factory preset at 250 pounds down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with 15/16" wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment. Do not attempt to set opener depth with spring pressure. The opener is designed to **operate against the depth stop and spring up when encountering a foreign object or hard ground.**

CAUTION: Do not operate the double disc openers at full down pressure tension when planting in rocky ground. Chipping of the blades may occur.

The opener blades should have a minimum of 2" of contact with each other. Blade adjustment can be made by moving inside spacer washers to the outer side of the blade. After making such an adjustment, check to be sure bearing assembly rivets are not hitting shank.

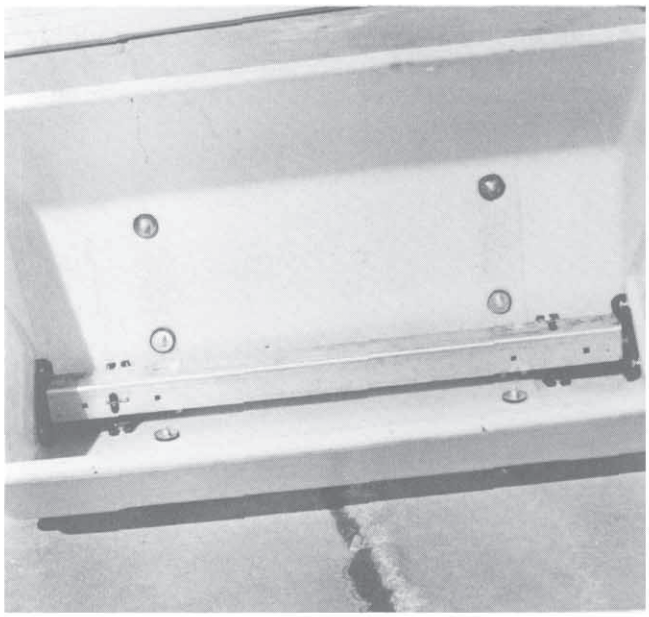
The scrapers on each blade may also be adjusted to make up for wear that may occur. Make sure the scraper is adjusted as close as possible to the blade without touching.



The opener assembly is designed to be locked in a raised position when the fertilizer attachment is not in use or during storage. To lock the opener, first raise the planter and place blocks under the openers. Then lower the planter until the hole in the pivot section aligns with the hole in the mounting bracket. Remove the lockup pin from the storage position in the mounting bracket and install it through the lockup hole and secure with cotter pins.

DRY FERTILIZER ATTACHMENT

The rate of dry fertilizer application is determined by sprocket combinations in the fertilizer transmission. After loosening the drive chain, slide the selected sprockets into alignment with the idlers. Then restore proper chain tension. Refer to the application charts for selection of sprocket combinations.



The dry fertilizer attachment meters granules by volume rather than weight. For this reason, and given the variances in brands and fertilizer analysis, the weight metered during actual application may vary considerably. Use the chart for reference only. It is suggested that a container be used to catch and measure application (as explained following the application chart) to obtain a closer estimate.

Since most fertilizers easily absorb moisture, it is important that fertilizer be kept dry during use and storage. In addition to waste, deposits of fertilizer left in the hopper can cause metal corrosion. Hoppers should be emptied at the end of each days use.

IMPORTANT: Certain analysis of fertilizer if placed too close to the seed may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturers recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.

⚠ **WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

CLEANING

The dry fertilizer hoppers are designed to tip forward for dumping and ease of cleaning. To dump hoppers, first disconnect the drive shaft from the transmission or adjacent hopper. LOOSEN HOSE CLAMPS AND REMOVE HOSES FROM EACH HOPPER.

Finally, remove the two cap screws from the hopper bracket at the rear of each hopper. Rotate hopper lids to the back side of the hopper and carefully tip hopper forward. After dumping contents, flush all loose fertilizer from the hopper and hoses.

At the end of the planting season, or when fertilizer attachment is not going to be used for a period of time, the hoppers should be disassembled, cleaned and coated with a rust preventative.

To disassemble spreader assemblies, remove the hair pins and baffle from the top of the auger. Then remove the cotter pin from the auger shaft adjacent to the large flat washer and pull auger assembly from the hopper. The bearings pass through the outer castings and need not be removed. Remove the cotter pin and washer from outer end of the auger shaft and remove all auger components for cleaning. Coat all parts with rust preventative before reassembly.

NOTE: Left hand and right hand springs are used on each auger shaft. Make sure springs auger fertilizer to the outer ends of the hopper when rotated in the direction of rotation they turn on the planter.

IMPORTANT: Frequent lubrication of auger bearings is critical for reliable operation.

LIQUID FERTILIZER ATTACHMENT

The rate of liquid fertilizer application is determined by the combination of sprockets on the squeeze pump driven and drive shafts. When changing sprocket combinations, make sure sprockets are in alignment, sprocket retaining collars are tight and chain tension is sufficiently restored.

The delivery rate chart found at the end of this section provides an approximate application rate only. Actual delivery will vary with temperature and the particular fertilizer being used.

IMPORTANT: Certain analysis of fertilizer if placed too close to the seed may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturers recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.

⚠ WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

Shut off valves provided at various locations, should be closed to shut off flow when the planter sets overnight or for extended periods of time. It is also important to close the tank valves whenever service on the pump or hoses is being performed. To prolong the life of the hoses in the squeeze pump, the discharge manifold must be repositioned to the rearward position to prevent hose distortion.

The discharge manifold must be in the forward position when the pump is in operation. To reposition the manifold, loosen the wing nuts and slide the manifold forward and sideways or rearward as required and retighten nuts.

CAUTION: Avoid excessive pressure when using the quick fill attachment. The rubber plugs installed in the manifold may be forced out under pressure.

If either of the end pump hoses should run off the back plate, loosen the hose clamp on the intake manifold and rotate the hose as follows.

For the *right hand hose* (facing the pump from front of planter) twist the hose ¼ turn in the clockwise direction.

For the *left hand hose* (facing front of pump) twist the hose ¼ turn in the counter-clockwise direction.

Retighten hose clamp.

Cleaning

The tanks and all hoses are made of sturdy plastic and rubber to resist corrosion. However, the tank should be rinsed with water after each season or extended period of non-use. Do not allow fertilizer to crystallize because of cold temperature or evaporation.

At the end of the planting season, thoroughly clean all parts with clean water and flush the tanks, hoses, and metering pump prior to storage.

PLANTING RATES FOR PLATELESS CORN METERS

SEED POPULATIONS/ACRE FOR DIFFERENT ROW WIDTHS

30 Inch	36 Inch	38 Inch	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)	Average Seed Spacing In Inches
12,200	10,200	9,600	14	30	4 to 8	17.1
13,100	10,900	10,300	14	28	4 to 8	16.0
14,100	11,700	11,100	14	26	4 to 8	14.9
14,900	12,500	11,800	16	28	4 to 8	14.0
15,700	13,100	12,400	18	30	4 to 8	13.3
16,100	13,400	12,700	16	26	4 to 8	13.0
16,600	13,900	13,100	14	22	4 to 8	12.6
18,100	15,100	14,300	18	26	4 to 8	11.6
19,000	15,900	15,000	16	22	4 to 8	11.0
19,100	16,000	15,100	22	30	4 to 8	10.9
20,300	17,000	16,100	14	18	4 to 8	10.3
20,500	17,100	16,200	22	28	4 to 8	10.2
21,400	17,800	16,900	18	22	4 to 8	9.8
22,100	18,400	17,400	22	26	4 to 8	9.5
22,600	18,900	17,900	26	30	4 to 8	9.2
22,800	19,100	18,000	14	16	4 to 8	9.1
23,200	19,400	18,300	16	18	4 to 8	9.0
24,200	20,200	19,100	26	28	4 to 7 1/2	8.6
24,400	20,300	19,200	28	30	4 to 7 1/2	8.6
25,900	21,800	20,600	22	22	4 to 7	8.0
27,800	23,400	22,100	30	28	4 to 6 1/2	7.5
28,100	23,500	22,200	28	26	4 to 6 1/2	7.4
29,400	24,500	23,200	18	16	4 to 6 1/2	7.1
29,800	24,900	23,500	16	14	3 to 6	7.0
30,100	25,200	23,800	30	26	3 to 6	6.9
30,800	25,800	24,300	26	22	3 to 6	6.8
31,900	26,600	25,200	22	18	3 to 5 1/2	6.5
33,200	27,700	26,200	28	22	3 to 5 1/2	6.3
33,600	28,000	26,500	18	14	3 to 5 1/2	6.2
35,600	29,700	28,100	30	22	3 to 5	5.9
35,900	30,000	28,300	22	16	3 to 5	5.8
37,700	31,500	29,800	26	18	3 to 4 1/2	5.5
41,000	34,300	32,400	22	14	3 to 4 1/2	5.1
42,400	35,400	33,500	26	16	3 to 4 1/2	4.9
43,500	36,300	34,300	30	18	2 to 4	4.8
45,700	38,200	36,100	28	16	2 to 4	4.6
48,500	40,500	38,300	26	14	2 to 3 1/2	4.3
52,200	43,600	41,200	28	14	2 to 3 1/2	4.0
55,900	46,700	44,100	30	14	2 to 3	3.7

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: The above sprocket combinations are best for average conditions. Changes in sprocket combinations may be required to obtain desired planting population.

The size and shape of seeds will effect the planting rate. Medium round corn is generally the most preferred while small flat is least desireable. Higher than optimum speeds may result in population rate increases or higher incidence of doubles and triples, particularly with small flat seeds.

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make a field check and adjust setting up or down in the transmission to obtain the desired seed drop.

PLANTING RATES FOR PLATELESS SOYBEAN METERS

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS - MEDIUM SEEDS

15 Inch	30 Inch	36 Inch	38 Inch	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)
64	32	27	25	14	30	4 to 8
68	34	28	27	14	28	4 to 8
73	36	30	29	14	26	4 to 8
77	38	32	30	16	28	4 to 8
79	40	33	31	18	30	4 to 8
80	40	33	32	16	26	4 to 8
82	41	34	32	14	22	4 to 8
86	43	36	34	18	26	4 to 8
90	45	38	36	16	22	4 to 8
91	45	38	36	22	30	4 to 8
96	48	40	38	14	18	4 to 8
97	49	41	38	22	28	4 to 8
101	51	42	40	18	22	4 to 8
105	52	44	41	22	26	4 to 8
107	54	45	42	26	30	4 to 8
109	54	45	43	14	16	4 to 8
110	55	46	44	16	18	4 to 8
115	58	48	45	26	28	4 to 7 1/2
116	58	48	46	28	30	4 to 7 1/2
124	62	52	49	22	22	4 to 7
133	66	55	52	30	28	4 to 6 1/2
134	67	56	53	28	26	4 to 6 1/2
140	70	58	55	18	16	4 to 6 1/2
142	71	59	56	16	14	3 to 6
143	72	60	56	30	26	3 to 6
147	73	61	58	26	22	3 to 6
152	76	63	60	22	18	3 to 5 1/2
158	79	66	62	28	22	3 to 5 1/2
159	80	66	63	18	14	3 to 5 1/2
169	85	70	67	30	22	3 to 5
171	85	71	67	22	16	3 to 5
179	90	75	71	26	18	3 to 5
191	95	79	75	22	14	3 to 5
196	98	82	77	26	16	3 to 5
201	100	84	79	30	18	3 to 5
208	104	87	82	28	16	3 to 5
218	109	91	86	26	14	3 to 5
232	116	97	92	28	14	3 to 5
246	123	102	97	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Soybeans vary in size from about 3500 seeds/lb. to about 1800 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

The above chart was based on uniformly sized soybeans. Your actual planting rate will vary somewhat from the above table. Generally, larger beans will give lower rates and smaller beans will give higher rates.

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make a field check and adjust setting up or down in the transmission to obtain the desired seed drop.

PLANTING RATES FOR PLATELESS SOYBEAN METERS

APPROXIMATE BEANS/ACRE FOR DIFFERENT ROW WIDTHS - SMALL SEEDS

15 Inch	30 Inch	36 Inch	38 Inch	Seeds/Foot	Seed Spacing (Inches)	Transmission Sprockets Drive	Transmission Sprockets Driven	Reccommended Speed Range (MPH)
241,500	120,700	100,600	95,300	7	1.7	14	30	4 to 8
257,100	128,500	107,100	101,500	7	1.6	14	28	4 to 8
275,400	137,700	114,700	108,700	8	1.5	14	26	4 to 8
289,300	144,600	120,500	114,200	8	1.4	16	28	4 to 8
300,400	150,200	125,100	118,600	9	1.4	18	30	4 to 8
303,700	151,900	126,600	119,900	9	1.4	16	26	4 to 8
310,200	155,100	129,300	122,500	9	1.4	14	22	4 to 8
324,500	162,200	135,200	128,100	9	1.3	18	26	4 to 8
340,900	170,400	142,000	134,600	10	1.2	16	22	4 to 8
343,700	171,900	143,200	135,700	10	1.2	22	30	4 to 8
364,600	182,300	151,900	143,900	10	1.1	14	18	4 to 8
368,300	184,100	153,500	145,400	11	1.1	22	28	4 to 8
383,500	191,700	159,800	151,400	11	1.1	18	22	4 to 8
396,600	198,300	165,300	156,600	11	1.1	22	26	4 to 8
406,200	203,100	169,300	160,400	12	1.0	26	30	4 to 8
410,100	205,100	170,900	161,900	12	1.0	14	16	4 to 8
416,600	208,300	173,600	164,500	12	1.0	16	18	4 to 8
435,200	217,600	181,400	171,800	12	1.0	26	28	4 to 7 1/2
437,500	218,700	182,300	172,700	13	1.0	28	30	4 to 7 1/2
468,700	234,400	195,300	185,000	13	0.9	22	22	4 to 7
502,200	251,100	209,300	198,200	14	0.8	30	28	4 to 6 1/2
504,800	252,400	210,300	199,300	14	0.8	28	26	4 to 6 1/2
527,300	263,700	219,700	208,100	15	0.8	18	16	4 to 6 1/2
535,700	267,800	223,200	211,500	15	0.8	16	14	3 to 6
540,800	270,400	225,300	213,500	15	0.8	30	26	3 to 6
553,900	277,000	230,800	218,700	16	0.8	26	22	3 to 6
572,900	286,400	238,700	226,100	16	0.7	22	18	3 to 5 1/2
596,600	298,300	248,600	235,500	17	0.7	28	22	3 to 5 1/2
602,600	301,300	251,100	237,900	17	0.7	18	14	3 to 5 1/2
639,200	319,600	266,300	252,300	18	0.7	30	22	3 to 5
644,500	322,200	268,500	254,400	18	0.7	22	16	3 to 5
677,000	338,500	282,100	267,300	19	0.6	26	18	3 to 5
721,100	360,500	300,500	284,600	21	0.6	22	14	3 to 5
740,300	370,200	308,500	292,200	21	0.6	26	16	3 to 5
758,500	379,300	316,100	299,400	22	0.6	30	18	3 to 5
787,500	393,700	328,100	310,800	23	0.5	28	16	3 to 5
825,200	412,600	343,800	325,700	24	0.5	26	14	3 to 5
876,500	438,300	365,200	346,000	25	0.5	28	14	3 to 5
929,100	464,500	387,100	366,700	27	0.5	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Soybeans vary in size from about 3500 seeds/lb. to about 1800 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

The above chart was based on uniformly sized soybeans. Your actual planting rate will vary somewhat from the above table. Generally, larger beans will give lower rates and smaller beans will give higher rates.

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make a field check and adjust setting up or down in the transmission to obtain the desired seed drop.

PLANTING RATES FOR PLATELESS SOYBEAN METERS

APPROXIMATE BEANS/ACRE FOR DIFFERENT ROW WIDTHS - MEDIUM SEEDS

15 Inch	30 Inch	36 Inch	38 Inch	Seeds/Foot	Seed Spacing (Inches)	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)
159,700	79,900	66,300	63,000	5	2.6	14	30	4 to 8
170,800	85,000	70,800	67,100	5	2.5	14	28	4 to 8
182,100	91,100	75,900	71,900	5	2.3	14	26	4 to 8
191,300	95,700	79,700	75,500	5	2.2	16	28	4 to 8
198,600	99,300	82,800	78,400	6	2.1	18	30	4 to 8
200,900	100,400	83,700	79,300	6	2.1	16	26	4 to 8
205,200	102,600	85,500	81,000	6	2.0	14	22	4 to 8
214,600	107,300	89,400	84,700	6	2.0	18	26	4 to 8
225,500	112,700	93,900	89,000	6	1.9	16	22	4 to 8
227,300	113,700	94,700	89,700	7	1.8	22	30	4 to 8
241,100	120,600	100,500	95,200	7	1.7	14	18	4 to 8
243,600	121,800	101,500	96,100	7	1.7	22	28	4 to 8
253,600	126,800	105,700	100,100	7	1.7	18	22	4 to 8
262,300	131,200	109,300	103,500	8	1.6	22	26	4 to 8
268,700	134,300	111,900	106,100	8	1.6	26	30	4 to 8
271,300	135,600	113,000	107,100	8	1.5	14	16	4 to 8
275,600	137,800	114,800	108,800	8	1.5	16	18	4 to 8
287,900	143,900	119,900	113,600	8	1.5	26	28	4 to 7 1/2
289,300	144,700	120,600	114,200	8	1.4	28	30	4 to 7 1/2
310,000	155,000	129,200	122,400	9	1.4	22	22	4 to 7
332,100	166,100	138,400	131,100	10	1.3	30	28	4 to 6 1/2
333,800	166,900	139,100	131,800	10	1.3	28	26	4 to 6 1/2
348,800	174,400	145,300	137,700	10	1.2	18	16	4 to 6 1/2
354,300	177,100	147,600	139,800	10	1.2	16	14	3 to 6
357,700	178,800	149,000	141,200	10	1.2	30	26	3 to 6
366,400	183,200	152,700	144,600	10	1.1	26	22	3 to 6
378,900	189,400	157,900	149,600	11	1.1	22	18	3 to 5 1/2
394,500	197,300	164,400	155,700	11	1.1	28	22	3 to 5 1/2
398,600	199,300	166,100	157,300	11	1.1	18	14	3 to 5 1/2
422,700	211,400	176,100	166,900	12	1.0	30	22	3 to 5
426,300	213,100	177,600	168,300	12	1.0	22	16	3 to 5
447,800	223,900	186,600	176,800	13	0.9	26	18	3 to 5
476,900	238,500	198,700	188,300	14	0.9	22	14	3 to 5
489,600	244,800	204,000	193,300	14	0.9	26	16	3 to 5
501,700	250,800	209,000	198,000	14	0.8	30	18	3 to 5
520,800	260,400	217,000	205,600	15	0.8	28	16	3 to 5
545,800	272,900	227,400	215,400	16	0.8	26	14	3 to 5
579,700	289,900	241,500	228,800	17	0.7	28	14	3 to 5
614,500	307,200	256,000	242,600	18	0.7	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Soybeans vary in size from about 3500 seeds/lb. to about 1800 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

The above chart was based on uniformly sized soybeans. Your actual planting rate will vary somewhat from the above table. Generally, larger beans will give lower rates and smaller beans will give higher rates.

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make a field check and adjust setting up or down in the transmission to obtain the desired seed drop.

PLANTING RATES FOR PLATELESS SOYBEAN METERS

APPROXIMATE BEANS/ACRE FOR DIFFERENT ROW WIDTHS - LARGE SEEDS

15 Inch	30 Inch	36 Inch	38 Inch	Seeds/Foot	Seed Spacing (Inches)	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)
106,900	53,500	44,600	42,200	3	3.9	14	30	4 to 8
113,900	56,900	47,400	44,900	3	3.7	14	28	4 to 8
121,900	61,000	50,800	48,100	3	3.4	14	26	4 to 8
128,100	64,100	53,400	50,600	4	3.3	16	28	4 to 8
133,000	66,500	55,400	52,500	4	3.2	18	30	4 to 8
134,500	67,300	56,000	53,100	4	3.1	16	26	4 to 8
137,400	68,700	57,200	54,200	4	3.1	14	22	4 to 8
143,700	71,900	59,900	56,700	4	2.9	18	26	4 to 8
151,000	75,500	62,900	59,600	4	2.8	16	22	4 to 8
152,200	76,100	63,400	60,100	4	2.8	22	30	4 to 8
161,400	80,700	67,300	63,700	5	2.6	14	18	4 to 8
163,100	81,500	68,000	64,400	5	2.6	22	28	4 to 8
169,800	84,900	70,800	67,000	5	2.5	18	22	4 to 8
175,600	87,800	73,200	69,300	5	2.4	22	26	4 to 8
179,900	90,000	75,000	71,000	5	2.3	26	30	4 to 8
181,600	90,800	75,700	71,700	5	2.3	14	16	4 to 8
184,500	92,300	76,900	72,800	5	2.3	16	18	4 to 8
192,700	96,400	80,300	76,100	6	2.2	26	28	4 to 7 1/2
193,700	96,900	80,700	76,500	6	2.2	28	30	4 to 7 1/2
207,600	103,800	86,500	81,900	6	2.0	22	22	4 to 7
222,400	111,200	92,700	87,800	6	1.9	30	28	4 to 6 1/2
223,500	111,800	93,100	88,200	6	1.9	28	26	4 to 6 1/2
233,500	116,800	97,300	92,200	7	1.8	18	16	4 to 6 1/2
237,200	118,600	98,800	93,600	7	1.8	16	14	3 to 6
239,500	119,800	99,800	94,500	7	1.7	30	26	3 to 6
245,300	122,700	102,200	96,800	7	1.7	26	22	3 to 6
253,700	126,900	105,700	100,100	7	1.7	22	18	3 to 5 1/2
264,200	132,100	110,100	104,300	8	1.6	28	22	3 to 5 1/2
266,900	133,400	111,200	105,300	8	1.6	18	14	3 to 5 1/2
283,100	141,500	117,900	111,700	8	1.5	30	22	3 to 5
285,400	142,700	118,900	112,700	8	1.5	22	16	3 to 5
299,800	149,900	124,900	118,400	9	1.4	26	18	3 to 5
319,300	159,700	133,100	126,100	9	1.3	22	14	3 to 5
327,900	164,000	136,600	129,400	9	1.3	26	16	3 to 5
335,900	168,000	140,000	132,600	10	1.2	30	18	3 to 5
348,700	174,400	145,300	137,700	10	1.2	28	16	3 to 5
365,500	182,700	152,300	144,300	10	1.1	26	14	3 to 5
388,200	194,100	161,700	153,200	11	1.1	28	14	3 to 5
411,400	205,700	171,400	162,400	12	1.0	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Soybeans vary in size from about 3500 seeds/lb. to about 1800 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

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OPERATION
PLANTING RATES FOR PLATELESS INTERMEDIATE RATE SORGHUM METERS

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS — MEDIUM SEEDS

10 Inch	15 Inch	20 Inch	30 Inch	36 Inch	38 Inch	40 Inch	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)
14.3	9.6	7.2	4.8	4.0	3.8	3.6	14	30	4 to 8
15.2	10.1	7.6	5.0	4.2	4.0	3.8	14	28	4 to 8
16.1	10.8	8.1	5.4	4.5	4.2	4.0	14	26	4 to 8
16.9	11.3	8.5	5.7	4.7	4.5	4.2	16	28	4 to 8
17.6	11.8	8.8	5.9	4.9	4.7	4.4	18	30	4 to 8
17.9	12.0	8.9	6.0	5.0	4.7	4.5	16	26	4 to 8
18.5	12.3	9.3	6.2	5.2	4.9	4.7	14	22	4 to 8
19.8	13.2	9.9	6.6	5.5	5.2	4.9	18	26	4 to 8
20.7	13.9	10.4	6.9	5.8	5.5	5.2	16	22	4 to 8
20.9	13.9	10.4	7.0	5.8	5.5	5.2	22	30	4 to 8
22.2	14.8	11.1	7.4	6.2	5.9	5.5	14	18	4 to 8
22.4	14.9	11.2	7.5	6.2	5.9	5.6	22	28	4 to 8
23.4	15.6	11.7	7.8	6.5	6.2	5.9	18	22	4 to 8
24.1	16.1	12.1	8.1	6.7	6.4	6.0	22	26	4 to 8
24.8	16.5	12.3	8.3	6.9	6.5	6.2	26	30	4 to 8
24.9	16.6	12.5	8.3	6.9	6.6	6.2	14	16	4 to 8
25.4	16.9	12.7	8.4	7.1	6.7	6.4	16	18	4 to 8
26.5	17.6	13.2	8.8	7.4	7.0	6.6	26	28	4 to 7½
26.6	17.8	13.3	8.9	7.4	7.0	6.7	28	30	4 to 7½
28.5	19.0	14.3	9.5	7.9	7.5	7.1	22	22	4 to 7
30.6	20.4	15.3	10.2	8.5	8.1	7.6	30	28	4 to 6½
30.7	20.5	15.4	10.3	8.6	8.1	7.7	28	26	4 to 6½
32.1	21.4	16.1	10.7	8.9	8.4	8.0	18	16	4 to 6½
32.6	21.7	16.3	10.9	9.1	8.6	8.1	16	14	3 to 6
32.9	21.9	16.4	11.0	9.1	8.7	8.3	30	26	3 to 6
33.7	22.5	16.9	11.2	9.4	8.9	8.4	26	22	3 to 6
34.9	23.2	17.5	11.7	9.7	9.2	8.7	22	18	3 to 5½
36.4	24.2	18.1	12.1	10.1	9.6	9.1	28	22	3 to 5½
36.7	24.4	18.3	12.2	10.2	9.6	9.2	18	14	3 to 5½
38.9	26.0	19.5	13.0	10.8	10.3	9.7	30	22	3 to 5
39.2	26.1	19.6	13.1	10.9	10.3	9.8	22	16	3 to 5
41.2	27.5	20.6	13.7	11.5	10.8	10.3	26	18	3 to 5
44.3	29.5	22.1	14.7	12.3	11.7	11.1	22	14	3 to 5
45.5	30.4	22.7	15.2	12.7	12.0	11.4	26	16	3 to 5
46.5	31.0	23.2	15.5	12.9	12.2	11.7	30	18	3 to 5
48.4	32.3	24.2	16.1	13.5	12.7	12.1	28	16	3 to 5
50.8	33.8	25.4	16.9	14.1	13.6	12.7	26	14	3 to 5
53.8	35.9	26.9	18.0	14.9	14.2	13.5	28	14	3 to 5
56.8	37.9	28.4	18.9	15.8	14.9	14.2	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Seeds vary in size from about 12000 seeds/lb. to about 25000 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

The above chart was based on uniformly sized seeds. Your actual planting rate will vary somewhat from the above table. Generally, larger seeds will give lower rates and smaller seeds will give higher rates

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make a field check and adjust setting up or down in the transmission to obtain the desired seed drop.

PLANTING RATES FOR PLATELESS LOW RATE SORGHUM METERS

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS - MEDIUM SEEDS

15 Inch	30 Inch	36 Inch	38 Inch	Transmission Sprockets Drive	Transmission Sprockets Driven	Recommended Speed Range (MPH)
2.9	1.5	1.2	1.1	14	30	4 to 8
3.1	1.5	1.3	1.2	14	28	4 to 8
3.3	1.6	1.4	1.3	14	26	4 to 8
3.4	1.7	1.4	1.4	16	28	4 to 8
3.6	1.8	1.5	1.4	18	30	4 to 8
3.6	1.8	1.5	1.4	16	26	4 to 8
3.8	1.9	1.6	1.5	14	22	4 to 8
4.0	2.0	1.7	1.6	18	26	4 to 8
4.2	2.1	1.8	1.7	16	22	4 to 8
4.3	2.1	1.8	1.7	22	30	4 to 8
4.5	2.3	1.9	1.8	14	18	4 to 8
4.6	2.3	1.9	1.8	22	28	4 to 8
4.7	2.4	2.0	1.9	18	22	4 to 8
4.9	2.5	2.0	1.9	22	26	4 to 8
5.0	2.5	2.1	2.0	26	30	4 to 8
5.1	2.5	2.1	2.0	14	16	4 to 8
5.2	2.6	2.1	2.0	16	18	4 to 8
5.4	2.7	2.2	2.1	26	28	4 to 7 1/2
5.4	2.7	2.3	2.1	28	30	4 to 7 1/2
5.8	2.9	2.4	2.3	22	22	4 to 7
6.2	3.1	2.6	2.5	30	28	4 to 6 1/2
6.2	3.1	2.6	2.5	28	26	4 to 6 1/2
6.5	3.3	2.7	2.6	18	16	4 to 6 1/2
6.6	3.3	2.8	2.6	16	14	3 to 6
6.7	3.3	2.8	2.6	30	26	3 to 6
6.9	3.4	2.9	2.7	26	22	3 to 6
7.1	3.5	3.0	2.8	22	18	3 to 5 1/2
7.4	3.7	3.1	2.9	28	22	3 to 5 1/2
7.5	3.7	3.1	2.9	18	14	3 to 5 1/2
7.9	4.0	3.3	3.1	30	22	3 to 5
8.0	4.0	3.3	3.1	22	16	3 to 5
8.4	4.2	3.5	3.3	26	18	3 to 5
9.0	4.5	3.7	3.6	22	14	3 to 5
9.3	4.6	3.9	3.7	26	16	3 to 5
9.5	4.7	3.9	3.7	30	18	3 to 5
9.8	4.9	4.1	3.9	28	16	3 to 5
10.3	5.2	4.3	4.1	26	14	3 to 5
10.9	5.5	4.6	4.3	28	14	3 to 5
11.5	5.8	4.8	4.6	30	14	3 to 5

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

IMPORTANT: Seeds vary in size from about 12000 seeds/lb. to about 25000 seeds/lb. The size marked on each bag is an average. Seeds within each bag may vary in size by as much as 50% greater or 50% smaller than the average.

The above chart was based on uniformly sized seeds. Your actual planting rate will vary somewhat from the above table. Generally, larger seeds will give lower rates and smaller seeds will give higher rates.

IMPORTANT: TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate, so make field check and adjust setting up or down in the transmission to obtain the desired seed drop

DRY INSECTICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS - CLAY GRANULES

Meter Setting	15 Inch	30 Inch	36 Inch	38 Inch
10	10.2	5.1	4.3	4.0
11	11.2	5.6	4.7	4.4
12	12.6	6.3	5.3	5.0
13	14.2	7.1	5.9	5.6
14	15.8	7.9	6.6	6.2
15	17.6	8.8	7.3	6.9
16	19.8	9.9	8.3	7.8
17	22.0	11.0	9.2	8.7
18	23.6	11.8	9.8	9.3
19	27.0	13.5	11.3	10.7
20	29.2	14.6	12.2	11.5
21	32.0	16.0	13.3	12.6
22	33.8	16.9	14.1	13.3
23	35.4	17.7	14.8	14.0
24	38.8	19.4	16.2	15.3
25	43.0	21.5	17.9	17.0
26	47.4	23.7	19.8	18.7
27	49.6	24.8	20.7	19.6
28	52.4	26.2	21.8	20.7
29	57.4	28.7	23.9	22.7
30	61.0	30.5	25.4	24.1

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS - SAND GRANULES

5	6.0	3.0	2.5	2.4
6	10.0	5.0	4.2	3.9
7	11.0	5.5	4.6	4.3
8	13.0	6.5	5.4	5.1
9	16.0	8.0	6.7	6.3
10	18.4	9.2	7.7	7.3
11	21.0	10.5	8.8	8.3
12	23.0	11.5	9.6	9.1
13	26.0	13.0	10.8	10.3
14	29.0	14.5	12.1	11.4
15	32.0	16.0	13.3	12.6
16	36.0	18.0	15.0	14.2
17	40.0	20.0	16.7	15.8
18	45.0	22.5	18.8	17.8
19	50.0	25.0	20.8	19.7
20	53.0	26.5	22.1	20.9
21	57.0	28.5	23.8	22.5
22	61.0	30.5	25.4	24.1
23	66.0	33.0	27.5	26.1
24	71.0	35.5	29.6	28.0
25	76.0	38.0	31.7	30.0

IMPORTANT: The above chart represents average values and should be used only as a starting point. Your actual rate will vary depending upon the insecticide you are using, your planting speed, and your plant population.

Your actual rate must be checked in the field with the actual insecticide that you are using and at the speed and population at which you will be planting.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

DRY HERBICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE FOR DIFFERENT ROW WIDTHS — CLAY GRANULES

Meter Setting	15 Inch	30 Inch	36 Inch	38 Inch
10	9.6	4.8	4.0	3.8
11	10.8	5.4	4.5	4.3
12	12.0	6.0	5.0	4.7
13	13.4	6.7	5.6	5.3
14	15.0	7.5	6.3	5.9
15	17.0	8.5	7.1	6.7
16	18.6	9.3	7.8	7.3
17	20.4	10.2	8.5	8.1
18	22.0	11.0	9.2	8.7
19	24.0	12.0	10.0	9.5
20	26.0	13.0	10.8	10.3
21	28.0	14.0	11.7	11.1
22	30.0	15.0	12.5	11.8
23	32.4	16.2	13.5	12.8
24	35.0	17.5	14.6	13.8
25	37.4	18.7	15.6	14.8
26	40.0	20.0	16.7	15.8
27	43.0	21.5	17.9	17.0
28	46.6	23.3	19.4	18.4
29	50.0	25.0	20.8	19.7
30	55.0	27.5	22.9	21.7

IMPORTANT: The above chart represents average values and should be used only as a starting point. Your actual rate will vary depending upon the herbicide you are using, your planting speed, and your plant population.

Your actual rate must be checked in the field with the actual herbicide that you are using and at the speed and population at which you will be planting.

Rates for 18 and 19 inch row spacing are two times 36 and 38 inch row spacing.

DRY FERTILIZER APPLICATION RATES

Approximate Rate in Pounds Per Acre Regular Rate Augers				
Drive Sprocket	Driven Sprocket	30 Inch Rows	36 Inch Rows	38 Inch Rows
18	36	87	73	68
18	30	101	85	79
24	36	127	107	99
24	30	151	129	118
18	18	181	152	141
18	16	208	175	162
36	30	215	180	168
24	18	242	203	180
24	16	269	225	210
36	18	357	300	278
36	16	390	327	304
* High Rate Augers				
18	16	312	263	243
36	30	323	270	252
24	18	363	305	284
24	16	404	338	315
36	18	536	450	417
36	16	585	491	456

* Uneven delivery may result in attempting to use lower rates than indicated by the chart.

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

This chart was calculated with a bulk density of 65 pounds per cubic foot.

IMPORTANT: Fertilizer application rates can vary from the weights calculated in the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer at the desired rate.

To check the exact number of pounds your fertilizer attachment will actually deliver on a 40 inch row spacing, proceed as follows:

Remove one spout from one of the fertilizer hoppers and attach a container under the opening. Engage the fertilizer attachment and drive forward for 130 feet. Weigh the amount of fertilizer caught in the container and multilply that amount by 100. The result will be the pounds of fertilizer delivered per acre when planting in 40-inch rows. To convert this delivery rate for narrower rows, multiply by the following conversion factors:

30" Multiply by 1.33
36" Multiply by 1.11
38" Multiply by 1.05

LIQUID FERTILIZER APPLICATION RATES

Drive	Driven	ROW SPACE Gal. Per Acre			Drive	Driven	ROW SPACE Gal. Per Acre		
		38	36	30			38	36	30
8	9	20.4	21.0	25.3	22	8	62.9	65.0	78.0
8	10	18.3	18.9	22.7	22	9	55.8	57.7	69.2
8	15	12.1	12.5	15.0	22	10	50.3	52.0	62.4
8	22	8.2	8.5	10.2	22	15	33.4	34.5	41.4
8	23	8.0	8.3	9.6	22	23	22.0	22.7	27.2
8	26	7.1	7.3	8.8	22	26	19.4	20.1	24.1
8	31	5.9	6.1	7.4	22	31	16.0	16.6	19.9
9	8	25.6	26.5	31.8	23	8	65.9	68.1	81.7
9	10	20.6	21.3	25.5	23	9	58.6	60.5	72.6
9	15	13.7	14.2	17.0	23	10	52.6	54.4	65.3
9	22	9.4	9.7	11.6	23	15	35.0	36.2	43.4
9	23	8.9	9.2	11.1	23	22	24.0	24.8	29.8
9	26	8.0	8.3	9.9	23	26	20.1	20.8	25.0
9	31	6.6	6.9	8.2	23	31	16.9	17.5	21.0
10	8	28.6	29.6	35.5	26	8	74.3	76.8	92.2
10	9	25.4	26.2	31.5	26	9	66.1	68.3	81.7
10	15	15.3	15.8	19.0	26	10	59.5	61.5	73.8
10	22	10.3	10.6	12.8	26	15	39.6	40.9	49.1
10	23	9.8	10.2	12.2	26	22	27.0	27.9	33.5
10	26	8.7	9.0	10.8	26	23	25.8	26.7	32.1
10	31	7.3	7.6	9.1	26	31	19.0	19.6	23.5
15	8	43.0	44.5	53.3	31	8	88.5	91.5	109.8
15	9	38.2	39.5	47.4	31	9	78.7	81.3	97.6
15	10	34.3	35.5	42.6	31	10	70.9	73.3	88.0
15	22	15.6	16.1	19.3	31	15	47.1	48.7	58.4
15	23	14.9	15.4	18.4	31	22	32.0	33.1	39.7
15	26	13.3	13.7	16.5	31	23	30.6	31.7	38.0
15	31	11.0	11.3	13.6	31	26	27.2	28.1	33.8

Above chart for planters equipped with Kinze drive. Recommended ground drive tire pressure 40 PSI. Recommended contact drive tire pressure 50 PSI.

This chart was calculated based on a solution weighing ten pounds per gallon.

IMPORTANT: Fertilizer application rates can vary from the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer at the desired rate.

LUBRICATION

The following pages show the locations of all lubrication points. Proper lubrication of all moving parts will help ensure efficient operation of your Kinze planter and prolong the life of friction producing parts. Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose type grease. Be sure to clean the fitting thoroughly before using grease gun. The frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

Refer to the Kinze Row Unit Manual for lubrication of all row units.

SEALED BEARINGS

A number of sealed bearings are used on your Kinze planter to provide trouble free operation. These are located in such areas as the drive shaft, row units, and transmission bearings. Sealed bearings are lubricated for life, and due to the seals, relubrication is not practical.

DRIVE CHAINS

The transmission and drive chains should be lubricated approximately every 8-10 hours with a quality engine oil or equivalent SAE 30 weight oil. A good quality spray lubricant may also be used for periodic chain lubrication. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt from the joints. Then soak the chain in oil so the lubricant can penetrate between the rollers and bushings.

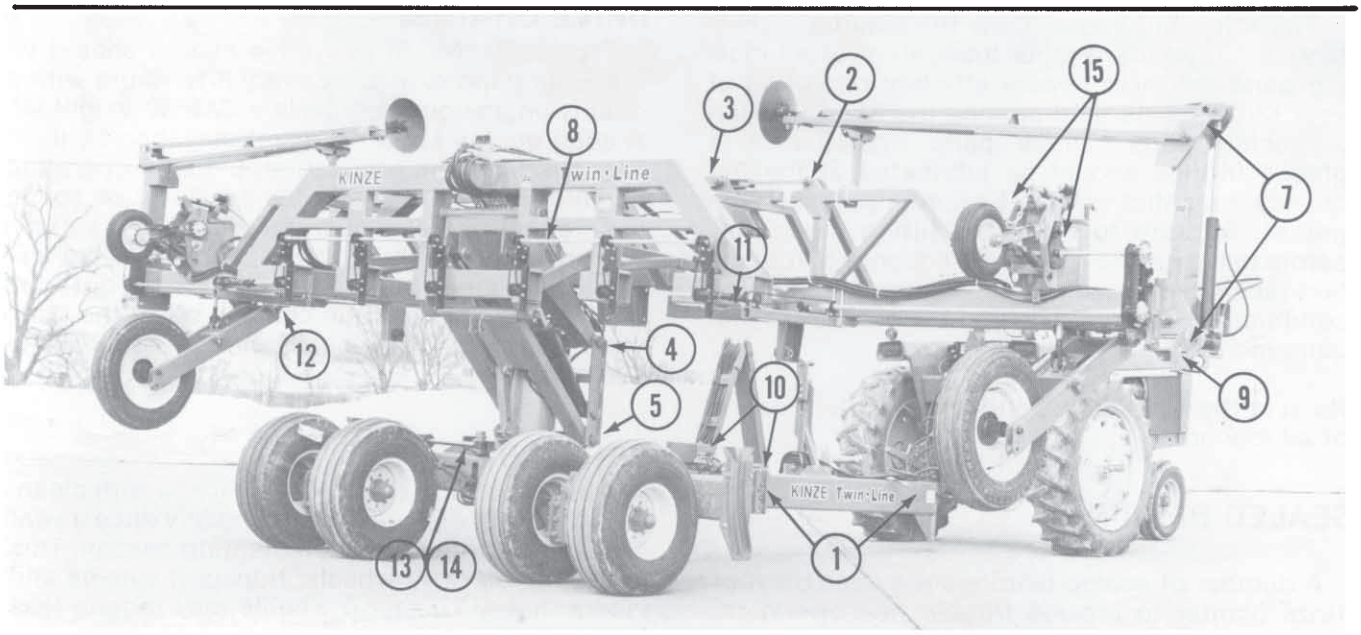
WHEEL BEARINGS

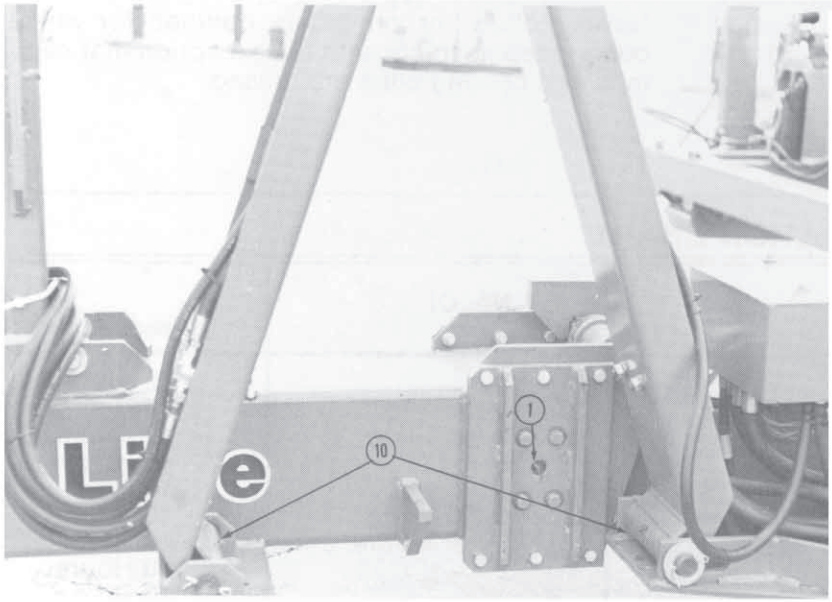
Wheel bearings should be repacked with clean, heavy-duty axle grease approximately once a year or at the beginning of each planting season. This applies to all drive wheels, transport wheels and marker hubs. Transport wheels may require less frequent service depending upon amount of road travel. Follow the procedure outlined for wheel bearing replacement with the exception that bearings and bearing cups are reused.

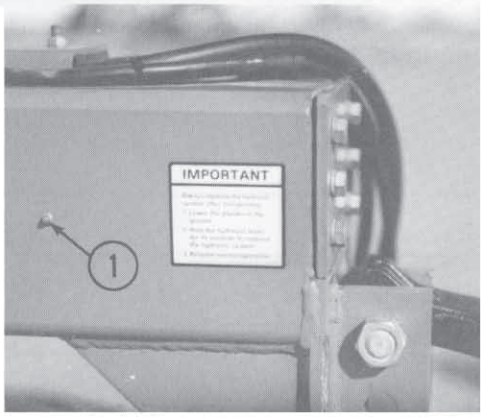
LUBRICATION CHART

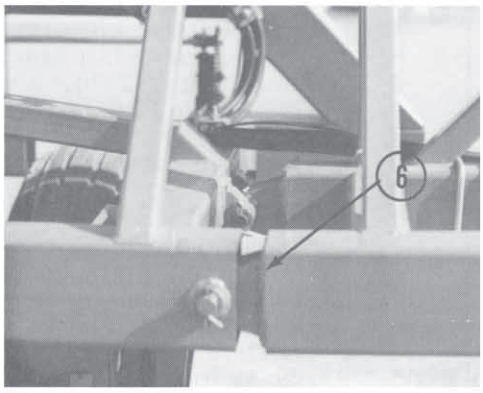
Ref. No.	Description	No. Of Zerks	Frequency
1.	Outer Hitch	4	10 Hours
2.	Wing Lock Link (12 Row and Up)	1 Per Link	10 Hours
3.	Wing Lock Plate (12 Row and Up)	2 Per Plate	10 Hours
4.	Upper Parallel Lift Arm	5	10 Hours
5.	Lower Parallel Lift Arm	5	10 Hours
6.	Wing Hinge (12 Row and Up)	2 Per Wing	10 Hours
7.	Low Profile Double Fold Marker	2 Per Marker	10 Hours
8.	Lift Lock	2	10 Hours
9.	Transport Latch	1	10 Hours
10.	Hose Takeup	2	10 Hours
11.	Drill Shaft (12 Row and Up)		
	Universal Joint	4	10 Hours
	Coupling Shaft	2	5 Hours
12.	Lift/Drive Wheel Module Pivot	2 Per Module	10 Hours
13.	Rotation Lock Link	2	10 Hours
14.	Rotation Lock Plate	1	10 Hours
15.	Wheel Tower	2 Per Tower	10 Hours
16.	Dry Fertilizer Drive (12 Rows and Up)		
	Universal Joint	4	10 Hours
	Coupling Shaft	2	5 Hours
17.	Dry Fertilizer Hopper	2 Per Hopper	10 Hours
18.	Shut Off Valve (Liquid Fertilizer)	1 Per Valve	10 Hours
19.	Squeeze Pump	8 Per Pump	10 Hours

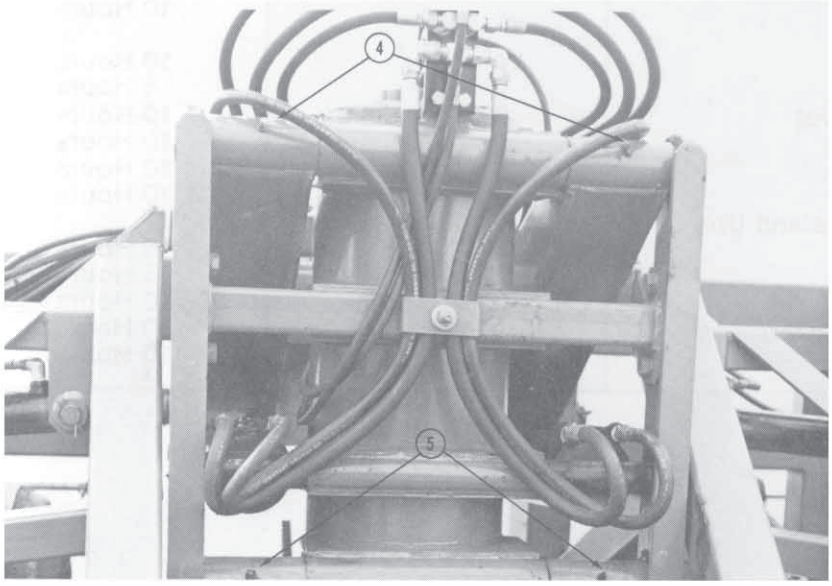
LUBRICATION

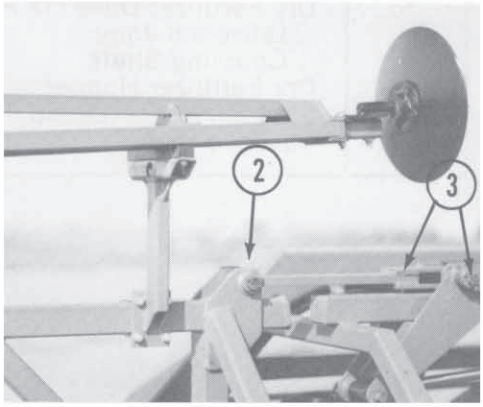


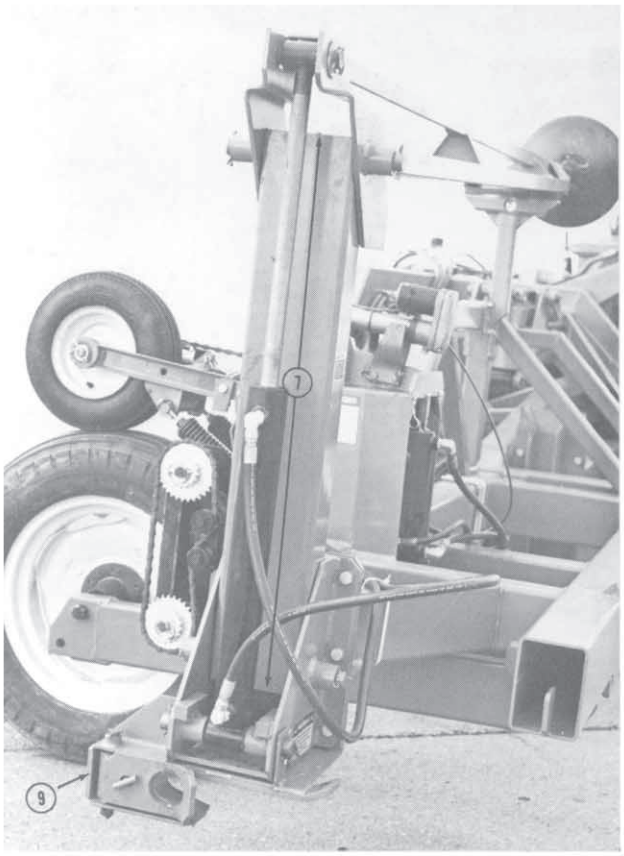








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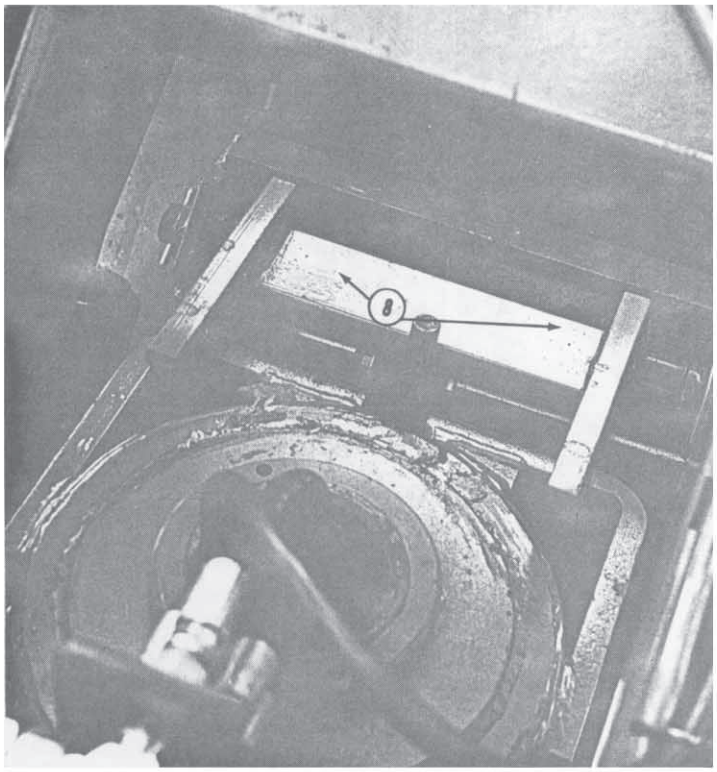
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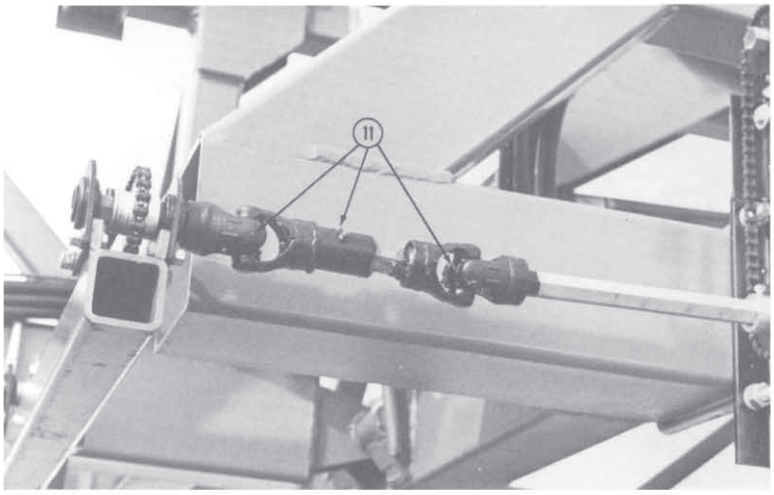
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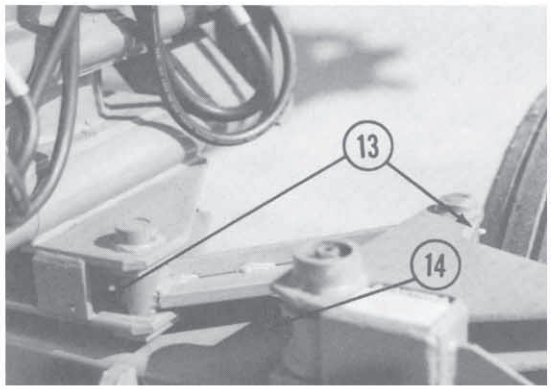
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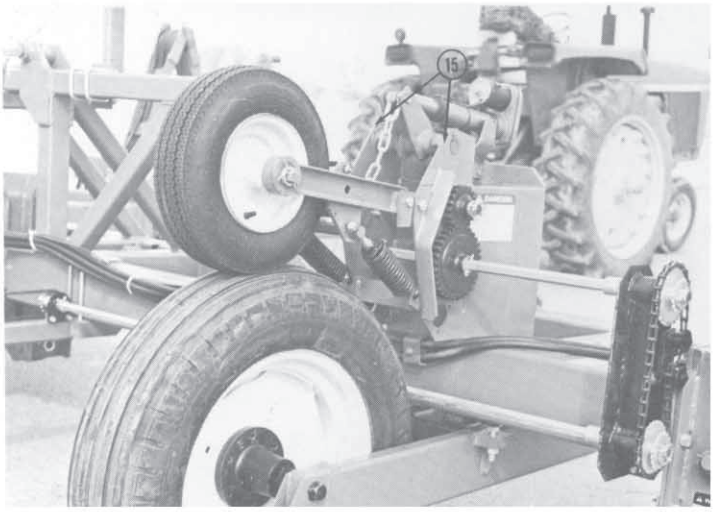
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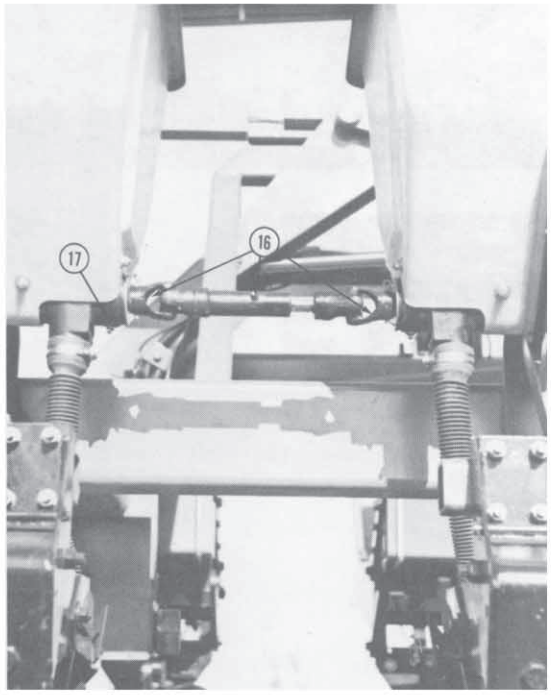
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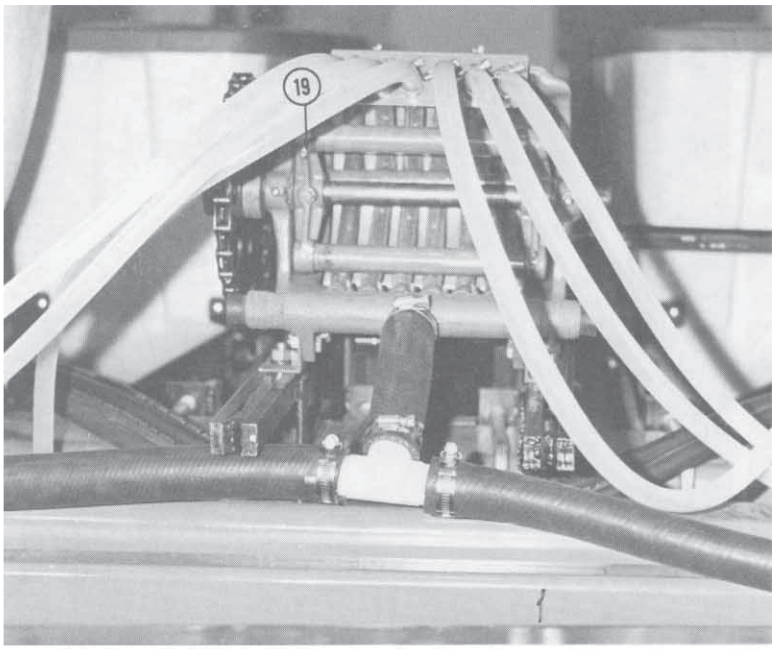
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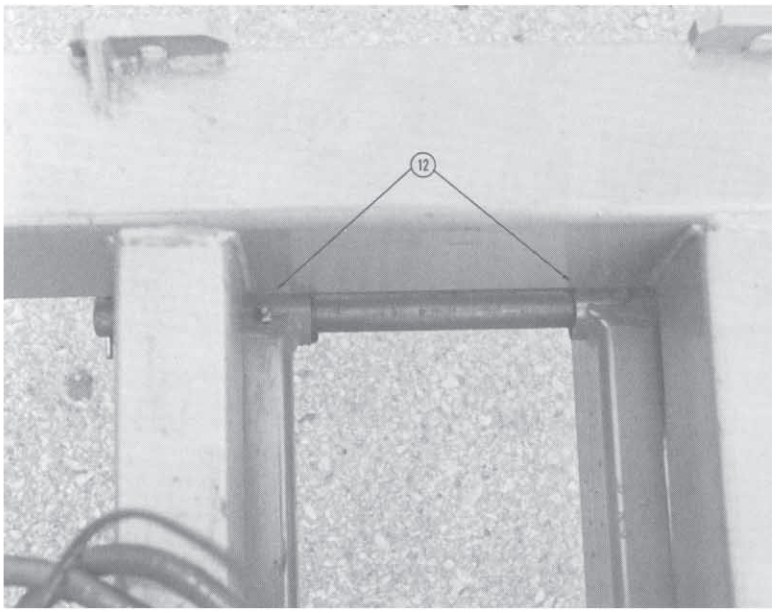
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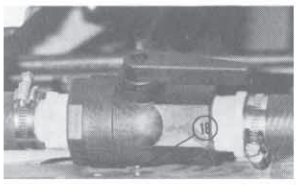
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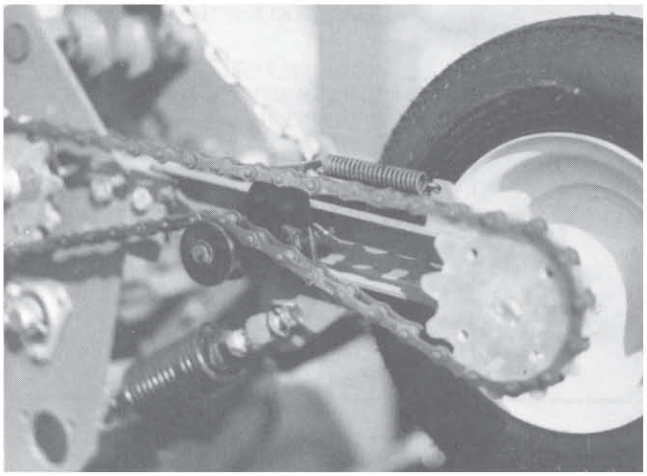
MOUNTING BOLTS AND HARDWARE

Before operating the planter for the first time, check to be sure all nuts and bolts are tight. Check all nuts and bolts again after approximately the first 50 hours of operation and at the beginning of each planting season thereafter.

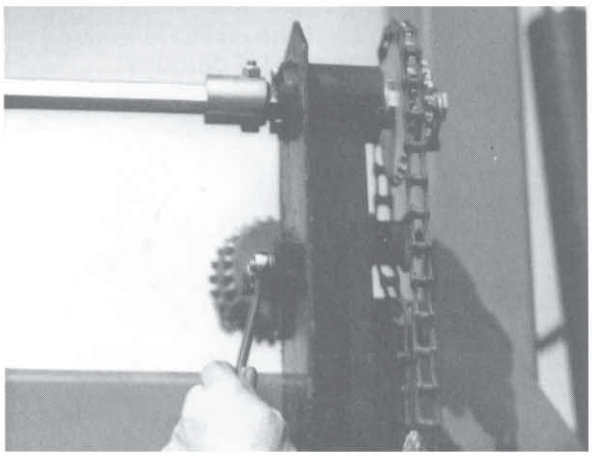
All bolts used on the Kinze planter are Grade 5 (high strength) unless otherwise noted. Refer to the torque value chart in the assembly section of this manual when tightening bolts.

NOTE: Overtightening bolts can cause as much damage as undertightening. Tightening a bolt beyond the recommended range can reduce its shock load capacity.

CHAIN TENSION ADJUSTMENT

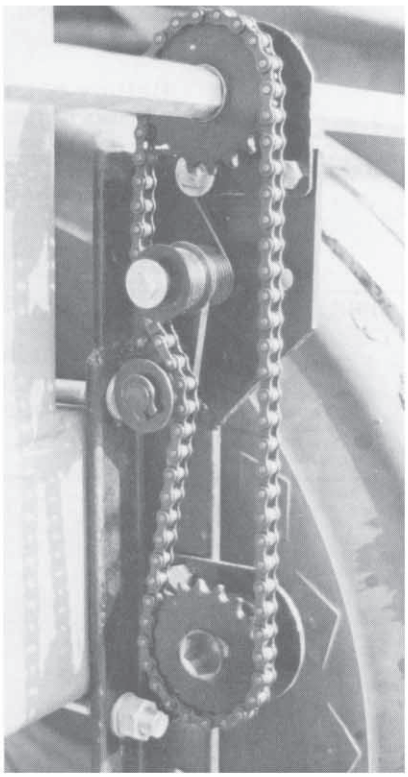


Many of the drive chains are spring loaded and therefore self-adjusting. The only adjustment needed is to shorten the chain if wear stretches the chain and reduces spring tension. The pivot point of these idlers should be checked periodically to insure they will rotate freely.



The remaining idlers are fixed position idlers and are adjusted by loosening a bolt on the idler and rotating the idler until all slack has been removed from the chain. Tighten the bolt. Rotate the planter shaft and check to insure all slack has been removed from the chain. The fixed position idler is used where sprocket changes need to be made such as in the seed transmission and dry fertilizer transmission.

The liquid fertilizer squeeze pump chain is adjusted by sliding the pump forward or backward to obtain the proper chain adjustment.



SOLENOID VALVE INSPECTION

The solenoid valve consists of a chambered body containing a cartridge valve which is activated by an electrical coil.

If the solenoid or solenoids fail to operate first determine if the problem is electrical or hydraulic. If the valve is working properly a click will be heard when the solenoid coil is energized. This will be the valve stem opening up. If no sound is heard, check the solenoid coil by touching the top of the coil housing with a metallic object such as a pliers or screwdriver. If the coil is working properly the coil housing will be strongly magnetized when energized. If the voltage to the coil is low the coil will be weakly magnetized when energized and no click will be heard.

TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
None of the solenoids will operate.	Low voltage. Blown Fuse. Battery connection. Wiring harness damaged.	Must be connected to 12 volt only. Replace fuse in back of control panel on tractor with 15 amp. only. Clean and tighten. Repair or replace.
One solenoid valve will not operate.	Bad switch. Cut wire in harness. Bad coil. Poor connection at coil.	Replace on control panel. Find and repair. Replace. Check.
Valve operating when not energized.	Valve stem stuck open. O-ring leaking. Foreign material under poppet.	Replace cartridge. Install new o-ring kit. Remove cartridge and clean.

FLOW CONTROL VALVE INSPECTION

The flow control valves should be adjusted for raise and lower speed as part of the assembly procedure or upon initial operation. If the valve fails to function properly or requires frequent adjustment, it should be removed for inspection. Check for foreign material and contamination on both the valve and the seating area of the valve body. Replace any components found to be defective.

PRESSURE RELIEF VALVE INSPECTION

If the pressure relief valve fails to release the tongue lock or function properly, remove the valve from the valve block and check for foreign material or check to see if the o-ring is leaking internally. Replace if found to be defective.

WHEEL OR MARKER BEARING LUBRICATION OR REPLACEMENT

1. Raise tire clear of ground and remove wheel or marker blade.
2. Remove hub cap from hub.
3. Remove cotter pin, axle nut, and washer.
4. Slide hub from axle or spindle.
5. Remove bearing cups and discard if bearings are being replaced. Clean hub and dry.
6. Press in new bearing cups with thickest edge facing in.
7. Pack bearings with heavy duty wheel bearing grease thoroughly forcing grease between roller cone and bearing cage. Also fill the space between the bearing cups in the hub with grease.
8. Place inner bearing in place and press in new grease seal.
9. Clean axle or spindle and install hub.
10. Install outer bearing, washer, or outer seal and slotted hex nut. Tighten slotted hex nut while rotating hub until there is some drag. This assures that all bearing surfaces are in contact. Back off slotted nut to nearest locking slot and install cotter pin.
11. Fill hub caps approximately 3/4 full of wheel bearing grease and install on hub.
12. Install wheel or blade on hub and tighten evenly and securely.

PREPARATION FOR STORAGE

Store the planter in a dry sheltered area if possible.

Remove all trash that may be wrapped on sprockets or shafts and remove dirt that can draw and hold moisture.

Clean all drive chains and coat with a rust preventative spray, or better yet, remove chains and submerge in oil.

Lubricate planter and row units at all lubrication points.

If possible, remove weight from all tires particularly if the unit is stored outdoors, in which case it is best to remove wheels and tires for storage in a cool dry area.

Inspect the planter and row units for parts that are in need of replacement and order during the "off" season.

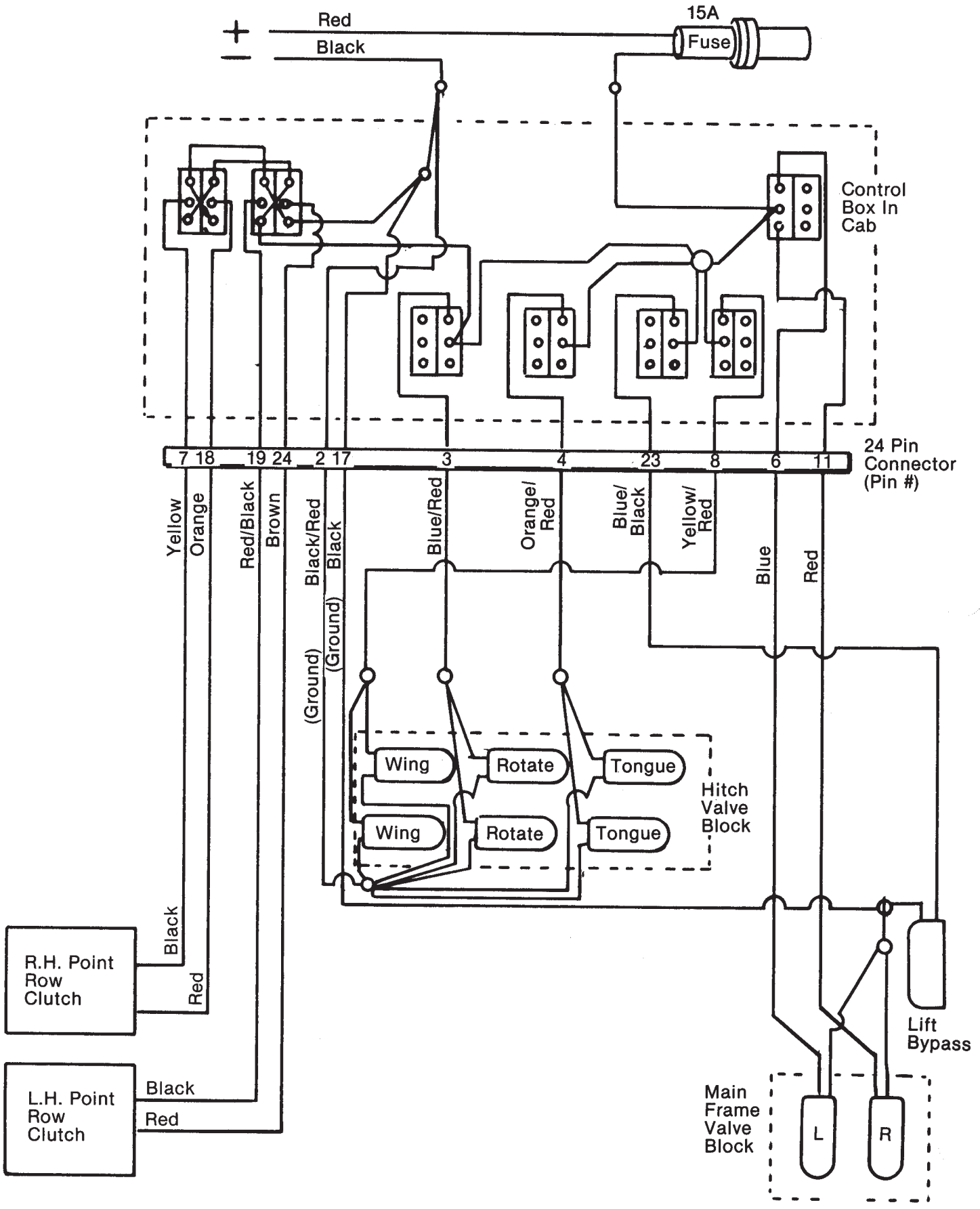
If the planter is equipped with a dry fertilizer attachment, clean the fertilizer hoppers, openers and all rubber spouts.

Make sure all seed, herbicide and insecticide hoppers are empty and clean.

If the planter is equipped with a liquid fertilizer attachment, open the shut off valve and flush water through the system.

Clean seed meters and store in a dry area. (Refer to row unit manual for proper procedures)

Grease exposed areas of cylinder rods before storing planter.


+
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15A
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24 Pin
Connector
(Pin #)
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Red/Black
Brown
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(Ground)
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Wing
Rotate
Tongue
Wing
Rotate
Tongue
Hitch
Valve
Block
R.H. Point
Row
Clutch
Black
Red
L.H. Point
Row
Clutch
Black
Red
Lift
Bypass
Main
Frame
Valve
Block
L
R

ASSEMBLY

HARDWARE

All bolts furnished with the planter unless otherwise noted are SAE Grade 5. If any bolts must be replaced, be sure to replace them with bolts of equal size and strength.

In many cases bolts have been pre-installed in the holes in which they go during assembly. It is suggested that bolts be left somewhat loose until parts have been assembled. This especially applies to bearing flanges, idler sprockets, etc. Then tighten all bolts to the torque specified in the chart unless otherwise noted.

DRY TORQUE VALUES - Ft. Lbs.			
Bolt Dia.	Grade 2 No Radial Lines	Grade 5 Three Radial Lines	Grade 8 Six Radial Lines
5/16"	11	17	25
3/8"	23	30	45
1/2"	55	85	
5/8"		170	
3/4"		300	
1"		670	
1 1/4"		910	

Note: Bolts having lock nuts should be tightened to approximately 50% of amounts shown in chart. Bolts lubricated prior to installation should be torqued to 70% of value shown on chart.

ROW UNIT ASSEMBLY

See the row unit manual for row unit mounting instructions. The right hand support angles for mounting row units on the center section of the planter are already mounted on the center section of the planter. Discard right hand supports that come with the row units.

See push unit assembly section for push unit assembly instructions.

PUSH UNIT ATTACHMENT

The push unit attachment is designed to be mounted on the front 5" x 7" tool bar of the Twin-Line planter. Each half of the planter has its own drive system with the center unit being driven by the right side transmission. Most of these set up instructions are for setting up one half of the package and must be repeated on the other half of the planter to complete the push unit attachment.

Step 1 -
Mount Push Row Units And Drill Shafts.

Mount the center push unit first. Remove the existing mounting plate from the row unit and install the special mounting plate. This mounting plate should have the vertical chain idler mounted in the front hole on the special mounting plate. Attach unit to the plate in the center of the front tool bar of the planter using four 5/8" x 1 1/2" cap screws, lock washers and hex nuts. Use the four center holes in the plate. See Illustration #1.

ILLUSTRATION #1

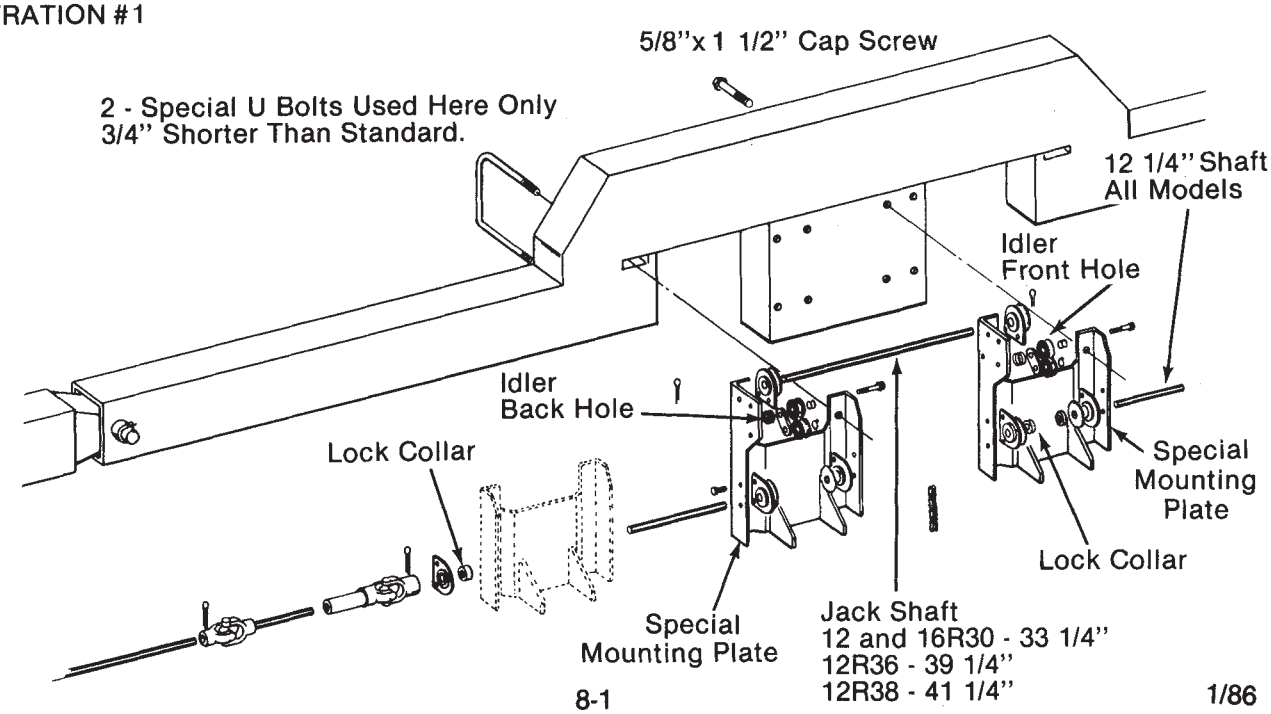
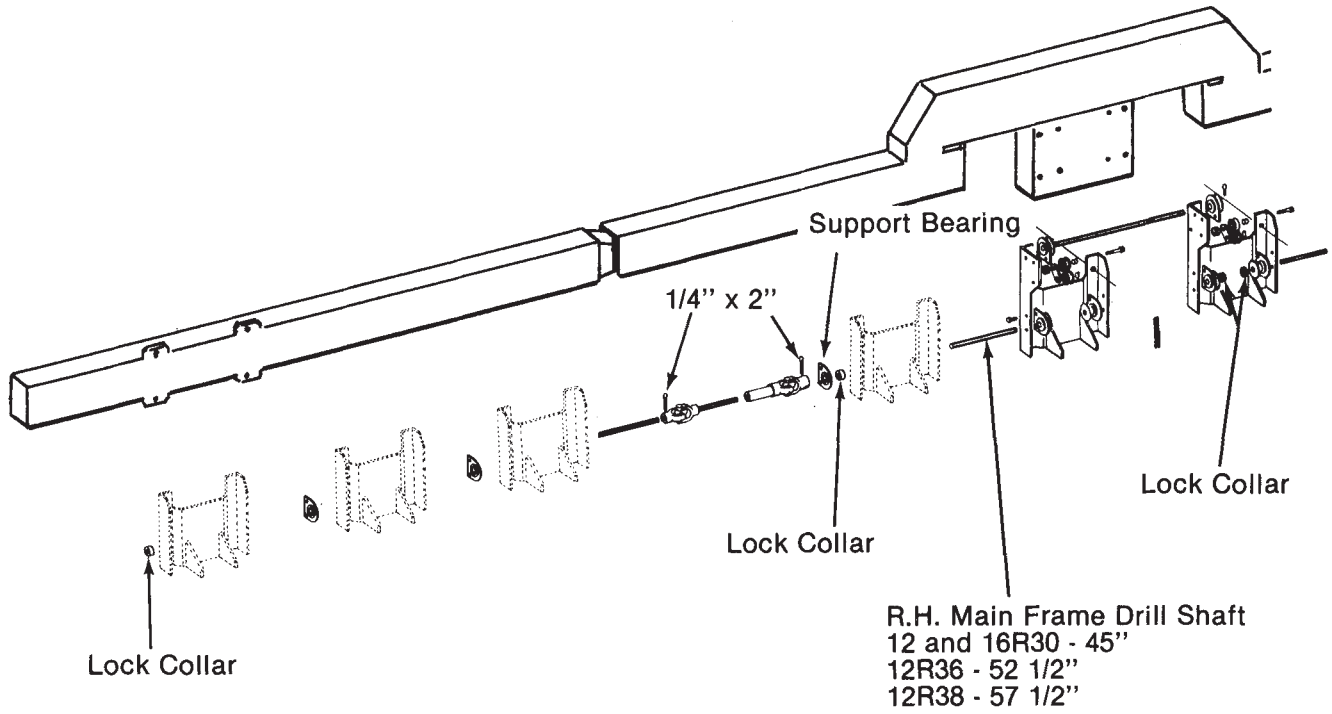
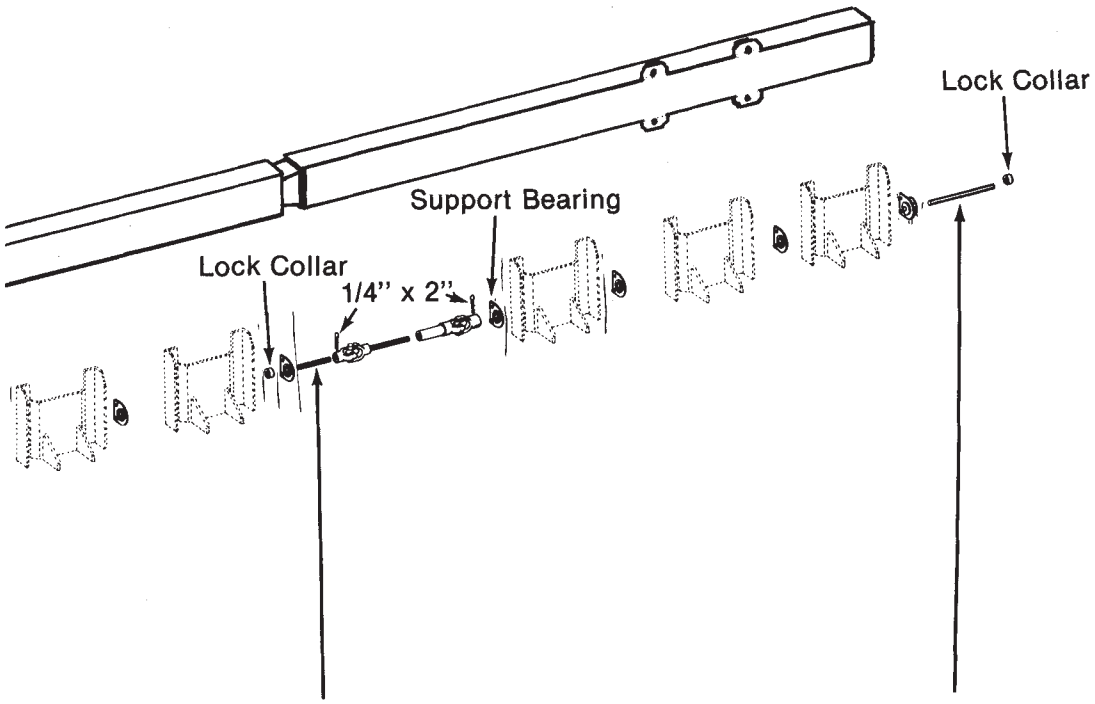


ILLUSTRATION #2





L.H. Main Frame Drill Shaft
12 and 16R30 - 35"
12R36 - 42 1/2"
12R38 - 47 1/2"

R.H. and L.H. Drill Shaft (Wing)
12R30 - 93 1/2"
12R36 - 112"
12R38 - 117 1/2"
16R30 - 153 1/2"

The second special mounting plate is used on the first row unit to the right of center. Remove the existing mounting plate from the row unit and install special mounting plate. The vertical chain idler on this unit should be mounted in the rear hole on the special mounting plate. Attach this row unit to the front tool bar at the proper spacing using two special 5" x 7" x 5/8" U-bolts. These U-bolts are 3/4" shorter than the standard U-bolts and are used in this location only. See Illustration #1.

Install the 7/8" jack shaft through the top sprockets of the two special mounting plates and install 1/4" x 1 1/2" cotter pins in both ends.

Install 7/8" x 12 1/4" shaft in center row unit with lock collars to the inside of each bearing sprocket.

Install the remaining push units on the main frame, centered on the proper row spacing using standard 5" x 7" x 5/8" U-bolts, lock washers and hex nuts.

Install drive sprocket/bearing assemblies and drill shafts to push units on the main frame before installing push units on the wings.

The sprocket/bearing assembly is attached to the inside of the left hand angle on the push unit mounting plate using two 3/8" x 1 1/4" cap screws, lock washers and hex nuts. NOTE: Three 3/8" flat washers must be placed between the drive sprocket/bearing assembly and the mounting angle for proper chain alignment. Do not tighten until drill shaft has been installed.

One drill shaft support bearing must be installed on the last row unit on the right side of the main frame as shown in Illustration #2. Attach to the angle on the mounting plate using two 3/8" x 1" cap screws, lock washers and hex nuts.

One additional support bearing is used on the first row unit on the left wing to support the drill shaft at the universal joints. See Illustration #2.

Now install the two drill shafts with the 1/4" holes to the outside with one lock collar just to the inside of the first drill shaft bearing. Note the different lengths of each drill shaft. Install the universal joint to the drill shaft using one 1/4" x 2" cotter pin. Slide the shaft in against the bearing. Slide the lock collar against the bearing from the other side and tighten the set screws.

Now tighten all the bearing/sprocket assemblies.

The remaining units on the wings can now be installed at the proper spacing. Use 5" x 7" x 5/8" U-bolts, lock washers and hex nuts.

Install bearing/sprocket assemblies but do not tighten at this time. Remember one support bearing must be installed on the first unit of the left wing to support the drill shaft at the universal joint. See Illustration #2. Install the wing drill shaft with the 1/4" hole to the inside of the planter and attach to the universal joint using a 1/4" x 2" cotter pin.

Tighten all the bearing/sprocket and support bearing assemblies at this time.

Install one lock collar on the outside end of each of the wing drill shafts. Do not tighten at this time.

Step 2 -
Assemble Push Unit Transmission.

The push unit transmission is mounted on the front 5" x 7" tool bar flush with the end of the bar as shown in Illustration #3. The transmission consists of two halves. One mounts to the front, the other to the back of the bar, using the same two 5/8" x 6 1/2" cap screws, lock washers and he nuts.

ILLUSTRATION #3

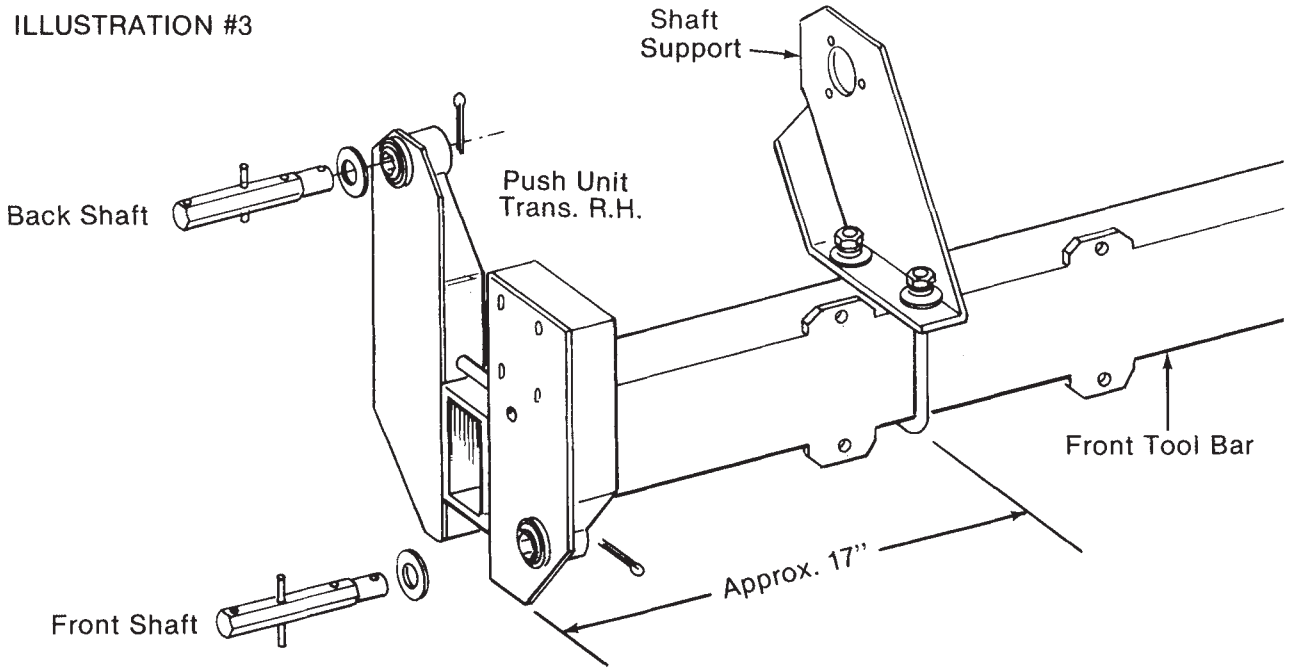
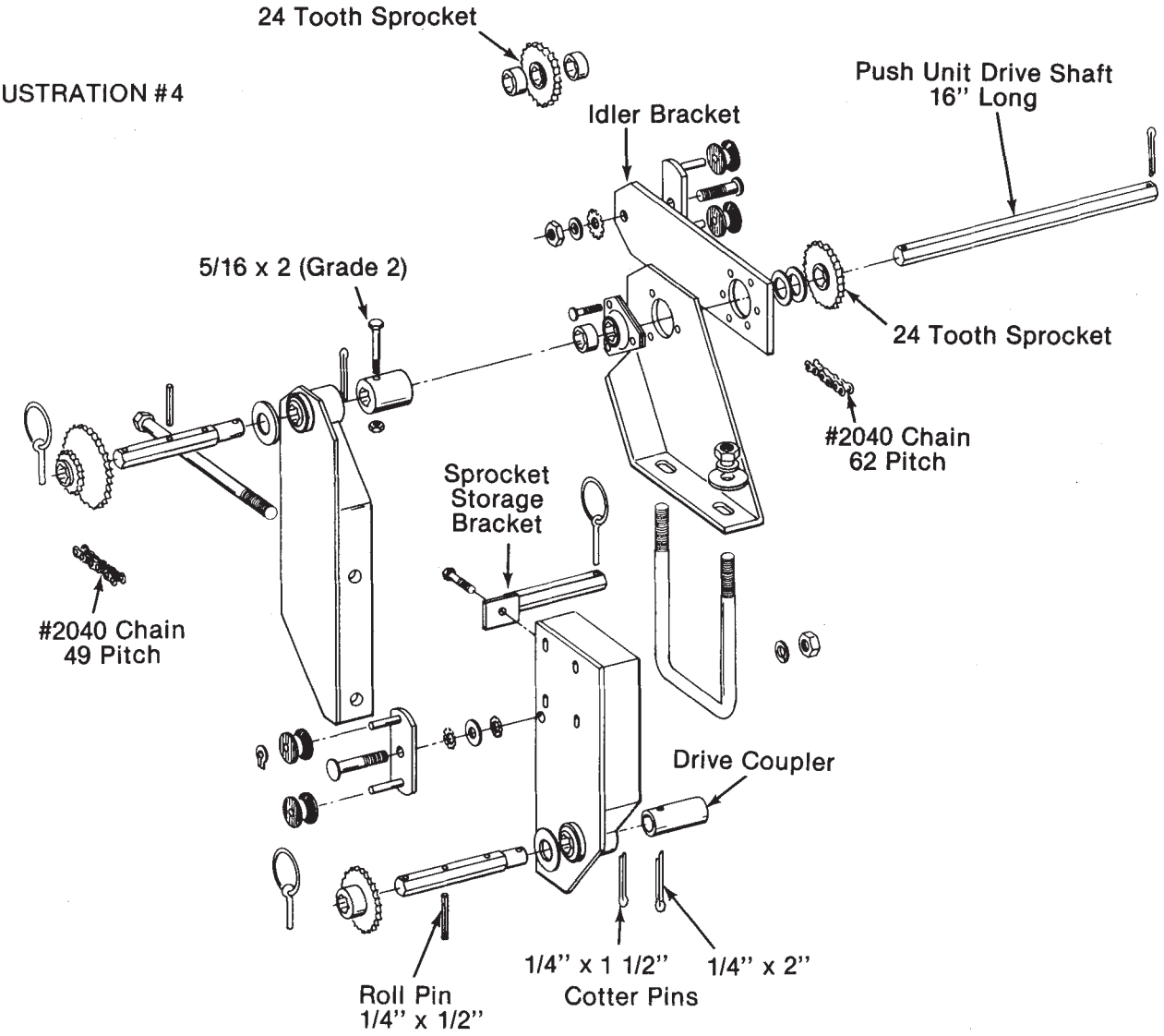


ILLUSTRATION #4



Step 3 -
Assemble Transmission Shafts.

Install the two 7/8" hex shafts into the transmission as shown in Illustration #4. Install one 1/4" roll pin, one 1" machinery bushing and one 1/4" x 1 1/2" cotter pin on the inside. The shaft with the 5/16" hole in the round end is to be installed in the back of the transmission and the shaft with the 1/4" hole in the round end is to be used in the front.

NOTE: The machinery bushing is used just on the outside of the transmission plate.

Step 4 -
Assemble Transmission Idler Assembly.

Install the chain idler into the hole provided on the front half of the transmission as shown in Illustration #4 using 1/2" carriage bolt. Install two internal/external lock washers with one flat washer in between. Secure with lock washer and hex nut.

Step 5 -
Assemble Sprocket Storage Bracket.

Install the sprocket storage bracket to the front half of the fertilizer transmission as shown in Illustration #4 using one 5/16" x 1" cap screw and lock nut.

Step 6 -
Assemble Push Unit Drive.

To the drive shaft support bracket bolt flangettes, bearing and idler bracket using three 5/16" x 1 1/4" carriage bolts, lock washers and hex nuts.

NOTE: The idler bracket has six holes. Be sure it is installed as shown in Illustration #4.

Make sure the right hand bracket is used on the right side of the planter as shown in Illustration #4. Install drive shaft support bracket to the front 5" x 7" tool bar using one 5/8" x 7" x 5" U-bolt, flat washers, lock washers and hex nuts. Do not tighten U-bolt at this time. Install 7/8" x 16" hex shaft in the following order from the inside of the planter out. Assemble 1/4" x 1 1/2" cotter pin in shaft. Next assemble 24 tooth sprocket with hub facing the idler bracket and two 1" machinery bushings. Insert shaft through 7/8" hex bearing in support bracket and install 7/8" hex lock collar. Couple to back shaft in push unit transmission using 7/8" hex bore coupler and install 5/16" cap screw (Grade 2) and lock nut.

With the drive shaft slid into the coupler as far as it will go, move the support bracket until all of the end play is removed from the inside end of the shaft. Square the support bracket with the tool bar. Align the drive shaft with the push unit transmission shaft by moving the bracket forward or back and then tighten U-bolt.

Slide lock collar on the drive shaft against the flangette/bearing and tighten set screws.

Install 24 tooth sprocket on the main drive between the row unit transmission and the drive wheel assembly. To install, remove the 1/4" cotter pin in the main drive shaft next to the gear on the drive wheel assembly and slide the shaft inward away from the row unit transmission until the 24 tooth sprocket can be installed on the shaft. Place one hex bore lock collar on each side of the sprocket. Reinstall the main drive shaft and replace 1/4" cotter pin.

Install 62 pitch drive chain between sprockets. Align front 24 tooth sprocket and locate lock collars and tighten set screws.

Install chain idler on inside of idler mounting plate as shown in Illustration #4 using 1/2" x 1 1/2" carriage bolt with one internal/external lock washer, flat washer and hex nut. Rotate idler to tighten chain and tighten hex nut.

Step 7 -
Couple Transmission To Drill Shaft.

Install 1 3/4" hex bore drive coupler on to the front shaft on the push unit transmission and secure to the shaft with 1/4" x 2" cotter pin. Slide hex drill shaft into the coupler as far as it will go. Slide lock collar that was previously installed in against push unit drive sprocket/bearing assembly and tighten set screws.

Step 8 -
Assemble Transmission Sprockets.

Install the desired sprocket combination on the transmission shafts. Double sprockets must be installed so that the desired sprocket is to the inside on the shaft and the single sprocket must be installed so that the hub of the sprocket is to the outside. Install lynch pins.

Install No. 2040 (49 pitch) transmission chain and rotate idler and tighten bolt. Check and make sure all slack is out of the chain.

Place remaining sprockets on storage shaft and secure with lynch pin.

Step 9 -
Install Meter Drive Clutch Assembly On Each Row Unit.

Install the meter drive clutch assembly to the left side of the hopper support panel. The 2 1/2" x 3 1/2" plate should be located on the outside of the diamond shaped hole in the panel and the clutch to the inside. Install the two 5/16" cap screws and snug up. It is very important that the clutch assembly be aligned with the seed meter. To do this install a seed hopper with the meter installed. Adjust the hopper latch and tighten making sure the hopper is down in its proper location. Turn the meter so that the drive pin in the meter shaft is vertical. Engage the drive clutch and adjust the clutch up or down so that the clutch is centered on the meter shaft with an equal amount of the drive pin sticking out beyond the drive coupler. Rotate the meter 90° and make horizontal adjustment. Tighten clutch.

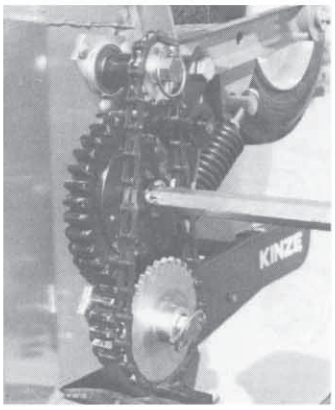
Check spools on the push unit drive chain idlers to see that they turn freely and install the unit drive chains.

Step 10 -
Final Inspection.

Check to see that all bolts are tight, all lock collars are in place and tight, and all cotter pins are installed.

Check alignment on all drive chains and check adjustment of all chain idlers.

EXTENDED DRILL SPROCKET PACKAGE ASSEMBLY INSTRUCTIONS



1. Install two flangette/hex bore bearing assemblies into lower holes in the drive wheel weldment using 5/16" x 1" carriage bolts, lock washers and hex nuts. Assemble only on the outside drive wheel assemblies on 16 row models.

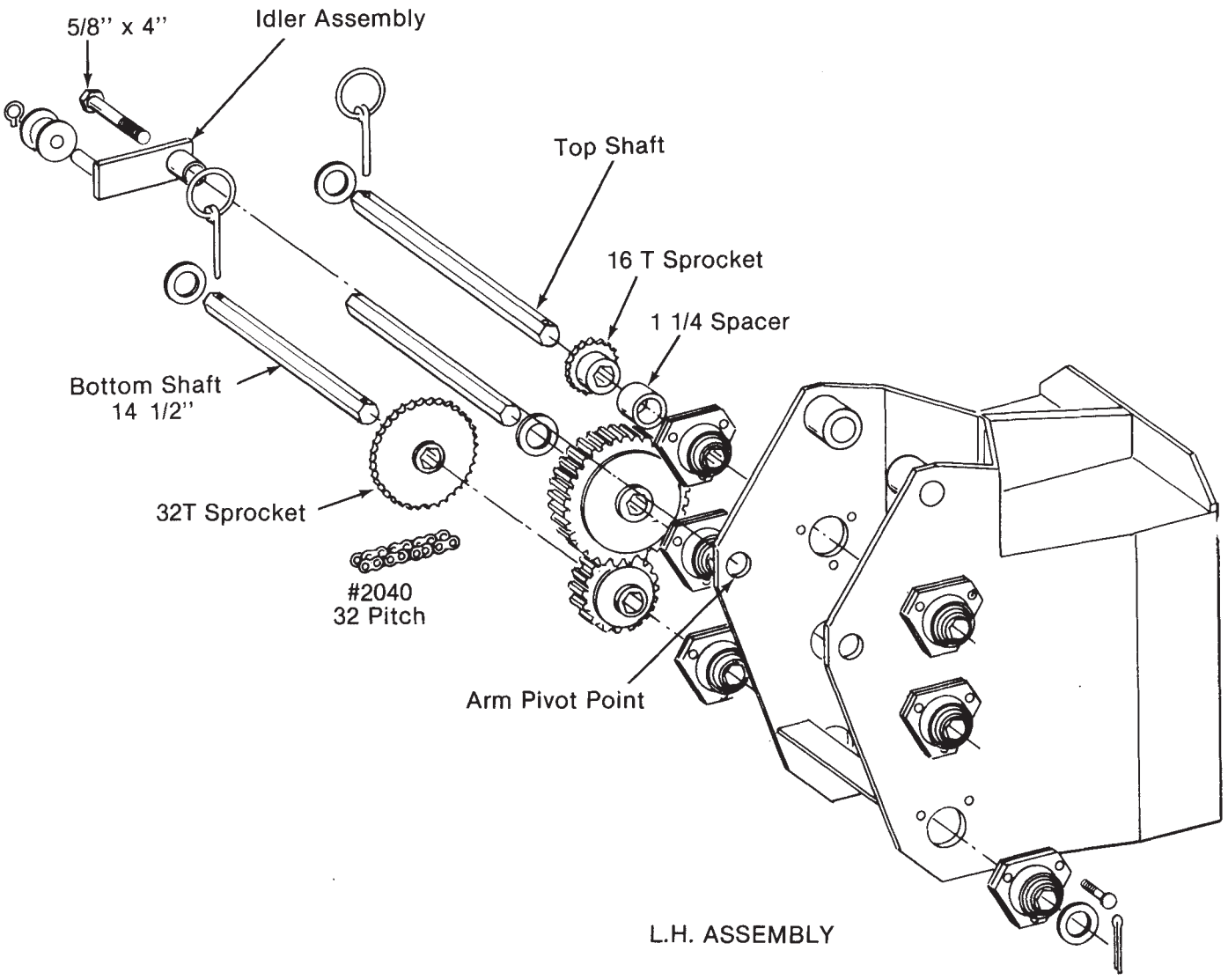
2. Remove small 16 tooth gear from top shaft in drive wheel weldment and place it with the hub to the outside on the 7/8" x 14 1/2" shaft to be installed in the lower holes in the drive wheel weldment. See illustration. Install 32 tooth sprocket with the hub to the outside against the gear on the lower shaft. Install one machinery bushing and lynch pin. Slide the shaft in and install a machinery bushing on the inside as required and install a 1/4" x 1 1/2" cotter pin.

3. Install spacer and 16 tooth sprocket with hub to the inside to the top shaft. Reinstall lynch pin. Use machinery bushings as required.

4. Install drive chain between sprockets.

5. Remove 5/8" cap screw from contact drive wheel arm pivot point. Install 5/8" x 4" cap screw along with chain idler. Reinstall flat washer and lock nut. Rotate idler to remove slack in chain and tighten.

NOTE: The extended drill sprocket package will cut the planter transmission speed in half. Therefore, when referring to the rate charts in the manual remember that the seeding rate will be approximately 1/2 of the chart reading. Planting speed can affect actual seeding rate so make a field check and adjust setting up or down in transmission to obtain desired seed drop.


5/8" x 4"
Idler Assembly
Top Shaft
16 T Sprocket
1 1/4 Spacer
Bottom Shaft
14 1/2"
32T Sprocket
#2040
32 Pitch
Arm Pivot Point

L.H. ASSEMBLY

ASSEMBLY

DRY FERTILIZER ATTACHMENT

The fertilizer attachment is designed to be mounted on the front 5" x 7" tool bar of the Twin-Line planter. Each half of the planter has its own drive system. The 12 row and 16 row packages mount the same way except for the addition of two hoppers, two mounting bars and four openers on the 16 row model. These set up instructions are for setting up one half of the package and must be repeated on the other half of the planter to complete the fertilizer attachment.

Step 1 -
Assemble Transmission.

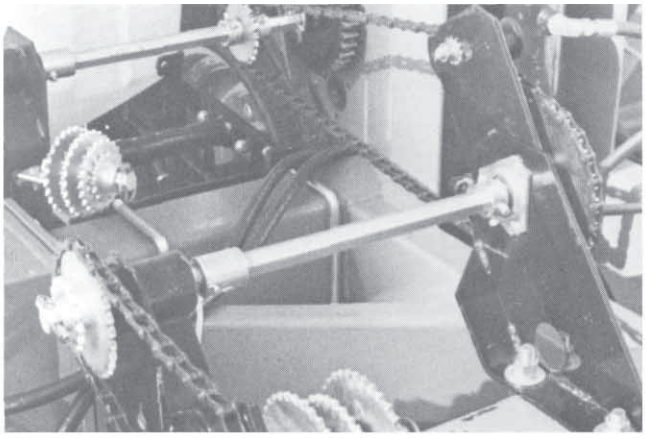
The fertilizer drive transmission is mounted on the front 5" x 7" tool bar and is to be mounted flush with the end of the bar as shown on Illustration #1. The transmission consists of two halves. One mounts to the front, the other to the back of the bar, using the same two 5/8" x 6" cap screws, lock washers and hex nuts.

Step 2 -
Assemble Auger Drive Bracket.

Mount the auger drive bracket to the fertilizer transmission as shown in Illustration #1 using four 3/8" x 1" carriage bolts, flat washers, lock washers and hex nuts. NOTE: Do **not** tighten at this time. The holes in both parts are slotted so that the fertilizer transmission shaft and the auger in the hopper can be aligned once installation is completed.

Step 3 -
Assemble Transmission Shafts.

Install the two 7/8" hex shafts into the transmission. These two shafts are of different length so make sure they are installed properly. Use the 6 5/8" shaft in the back of the transmission and install the 7 1/8" shaft in the front as shown in Illustration #1. Install both shafts as shown in the illustration with one 1/4" roll pin, one 1" machinery bushing and one 1/4" x 1 1/2" cotter pin on the inside. NOTE: The machinery bushing is used just on the outside of the transmission plate.



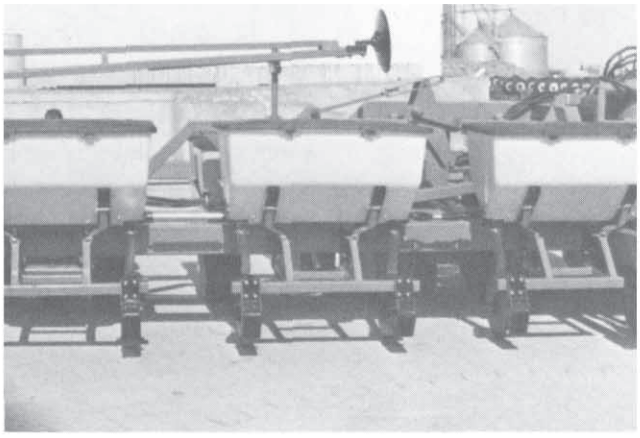


ILLUSTRATION #1

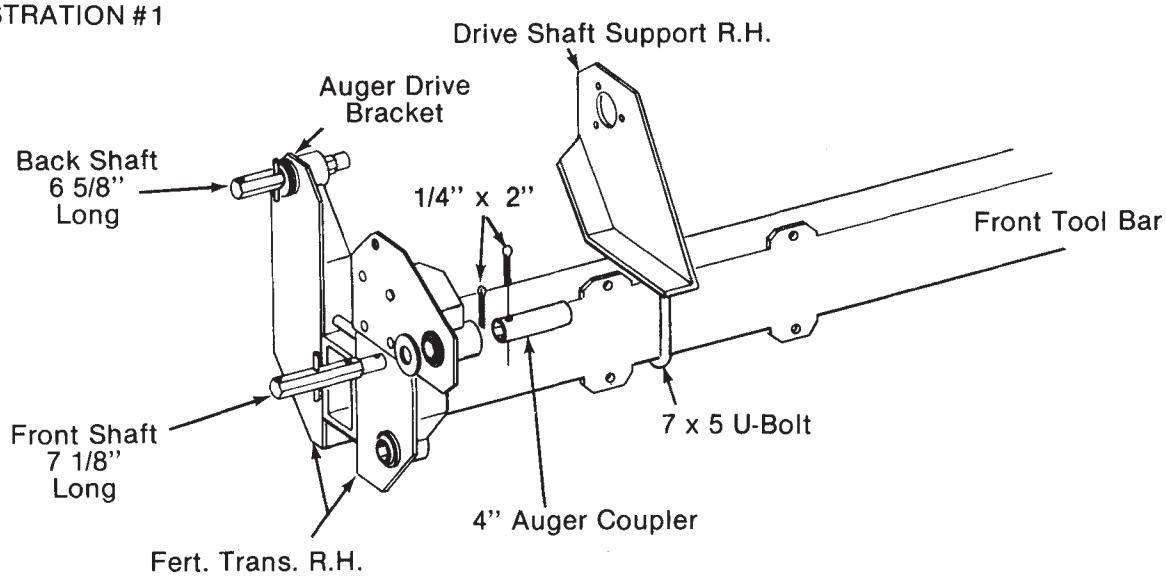
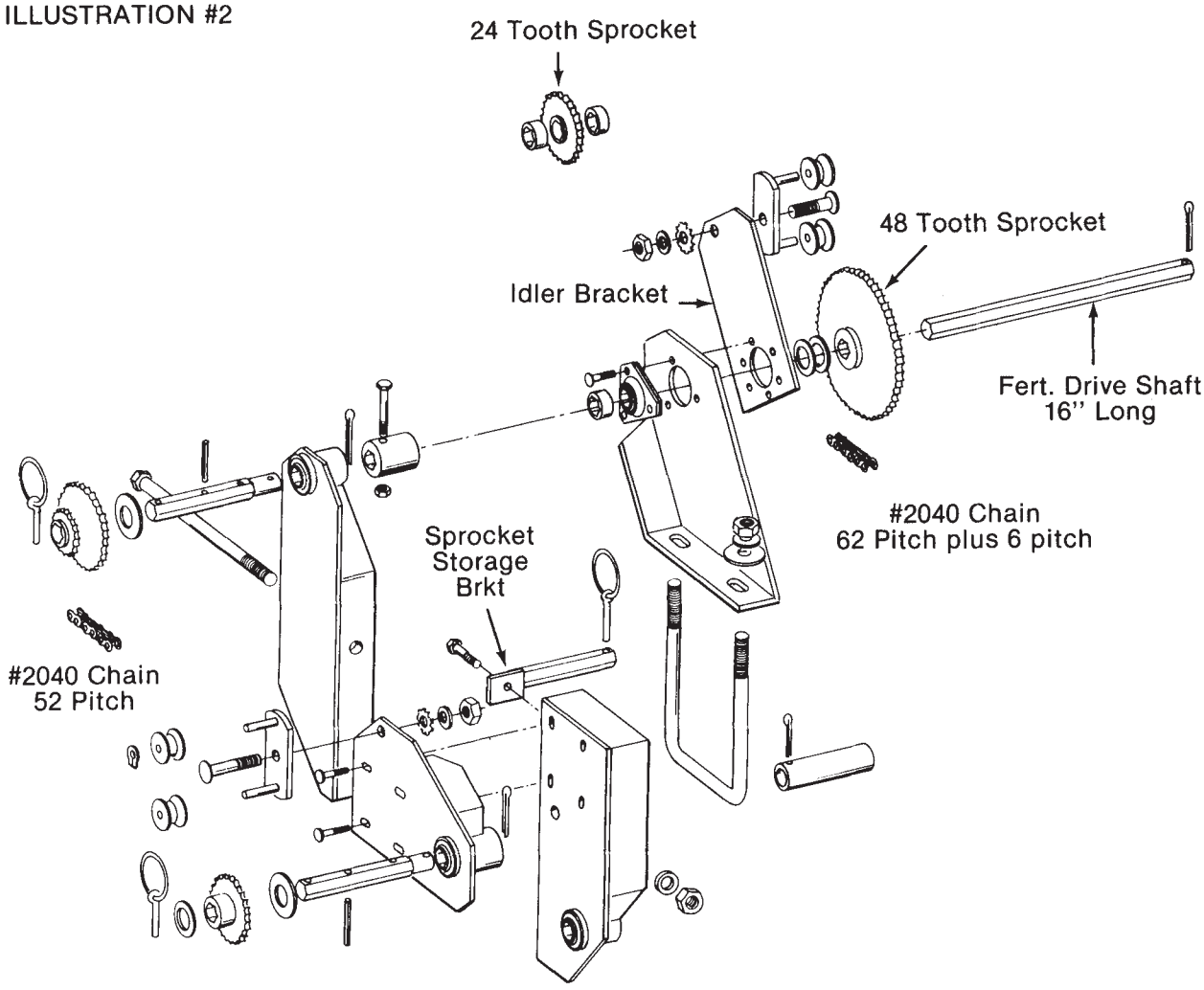


ILLUSTRATION #2



Step 4 -
Assemble Transmission Idler.

Install chain idler into hole provided on the auger drive bracket using one 1/2" x 1 1/2" carriage bolt. Use one internal/external lock washer, one flat washer and one hex nut on the inside of the auger drive bracket.

Step 5 -
Assemble Sprocket Storage Bracket.

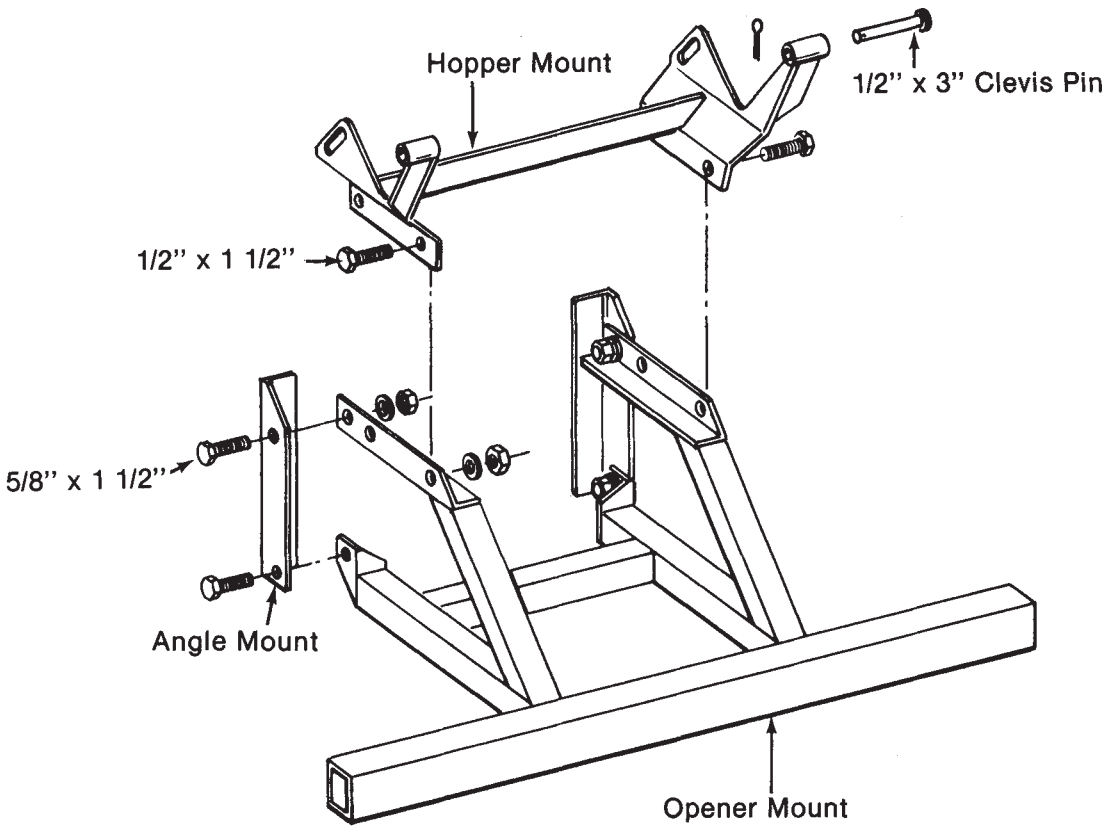
Install the sprocket storage bracket to the front half of the fertilizer transmission as shown in Illustration #2 using one 5/16" x 1" cap screw and lock nut.

Step 6 -
Assemble Fertilizer Drive.

To the drive shaft support bracket bolt flangettes, bearing and idler bracket using three 5/16" x 1 1/4" carriage bolts, lock washers and hex nuts. NOTE: The idler bracket has six holes. Be sure it is installed as shown in Illustration #2. Make sure the R.H. bracket is used on the right hand side of the planter as shown in Illustration # 2

Install drive shaft support bracket to the front 5" x 7" tool bar using one 5/8" x 7" x 5" U-bolt, flat washers, lock washers and hex nuts. Do not tighten U-bolt at this time. Install 7/8" x 16" hex shaft in the following order from the inside of the planter out. Assemble 1/4" x 1 1/2" cotter pin in shaft. Next assemble 48 tooth sprocket with hub facing the idler bracket and two 1" machinery bushings. Insert shaft through 7/8" hex bearing in support bracket and install 7/8" hex lock collar. Couple to back shaft in fertilizer transmission using 7/8" hex bore coupler and install 5/16" cap screw (grade 2) and lock nut.

ILLUSTRATION #3



With drive shaft slid into coupler as far as it will go, move support bracket until all of the end play is removed from the inside end of the shaft. Square support bracket with tool bar. Align drive shaft with fertilizer transmission shaft by moving bracket forward or back and then tighten U-bolt.

Slide lock collar on drive shaft against flangette/bearing and tighten set screws.

Install 24 tooth sprocket on main drive between the row unit transmission and drive wheel assembly. To install, remove the 1/4" cotter pin in the main drive shaft next to the gear on the drive wheel assembly and slide the shaft inward away from the row unit transmission until the 24 tooth sprocket can be installed on the shaft. Place one hex bore lock collar on each side of the sprocket. Reinstall main drive shaft and replace 1/4" cotter pin.

Install 68 pitch drive chain (62 pitch plus 6 pitch) between sprockets. Align front 24 tooth sprocket and locate lock collars and tighten set screws.

Install chain idler on inside of idler mounting plate as shown in Illustration #2 using 1/2" x 1 1/2" carriage bolt with one internal/external lock washer, flat washer and hex nut. Rotate idler to tighten chain and tighten hex nut.

Step 7 -
Assemble Angle Mounts to Opener Mounts.

Using 5/8" x 1 1/2" cap screws, lock washers and hex nuts, bolt angle mounts to opener mounts as shown in Illustration #3.

NOTE: On the 12 row 30 and 16 row 30 planter, one R.H. angle mount and one L.H. angle mount have smaller holes for mounting to the bar. These angle mounts are used on the center opener mount.

Step 8 -
Assemble Angle Mounts/Opener Mounts to Planter.

There are four different styles of opener mounts used. Illustration #4 shows the proper location of each. The center opener mount is bolted to the plate in the center of the planter using four 5/8" x 1 1/2" cap screws, lock washers and hex nuts. Mount the right hand mount to the right side of the tongue assembly with two inches between the tongue and opener bar. Attach the mount using two 3/4" x 5" x 7" U-bolts. Install the outside opener mount directly ahead of the wheel assembly using 4 special 3/4" x 2" cap screws, lock washers and hex nuts. (There are two additional opener mounts installed in this manner on 16 row models.) Using 3/4" x 5" x 7" U-bolts, install the remaining opener mounts centered 60" in on the tool bar as shown in Illustration #4.

Step 9 -
Assemble Hopper Mounts To Opener Mounts.

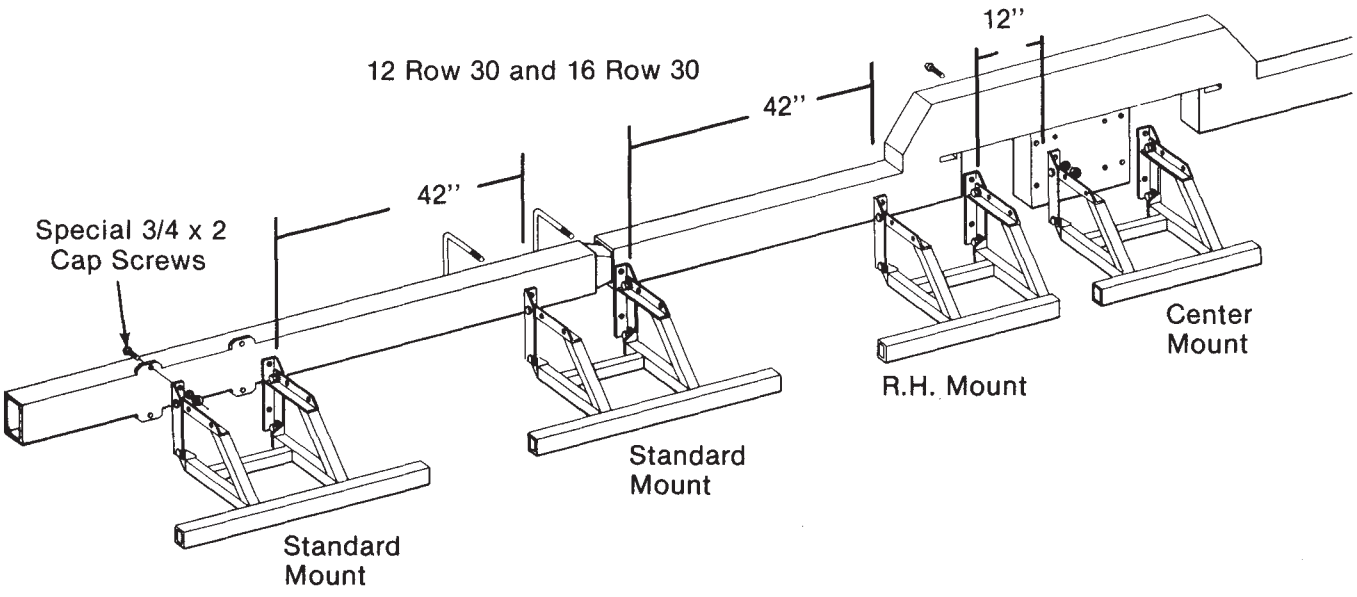
Install the hopper mounts to the opener mounts as shown in Illustration #3 using four 1/2" x 1 1/2" cap screws, lock washers and hex nuts. NOTE: Center opener mount does not get a hopper mount.

Step 10 -
Assemble Fertilizer Hoppers. (Lid/Hopper Straps)

Install two reinforcing straps in each hopper with bolts provided. Each reinforcing strap is drilled for installation of a rubber lid strap. Make sure this hole is closest to the front of the hopper. Assemble special flat washer, then rubber washer on 5/16" x 1 1/4" cap screw. With cap screw head to the outside of the hopper, insert cap screw with washers through hopper and then through reinforcing strap. Install lock washer and hex nut. To attach lid to hopper assemble 5/16" flat washer on 5/16" x 1 1/2" cap screw. Insert cap screw through rubber strap and then through reinforcing strap and secure with lock washer and hex nut.

(See dry fertilizer hopper illustration in parts section.)

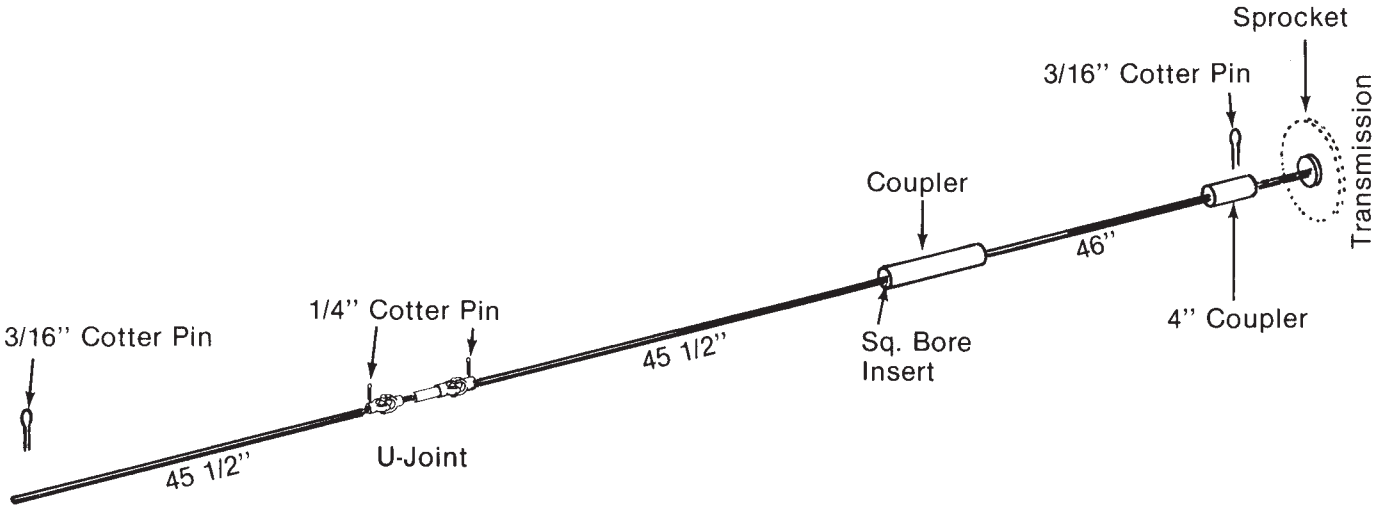
ILLUSTRATION #4



Starting from the center of the planter and working towards the outside install each hopper onto the hopper mount with the round hole in the hopper saddle toward the front and slotted holes toward the back. Using two 1/2" x 3" clevis pins and two 1/8" x 1" cotter pins through the round holes attach hopper to hopper mount. NOTE: Installing augers into each hopper as you install the hopper onto the planter will make installation of the augers easier.

Step 11 -
Assemble Fertilizer Hoppers. (Augers)

The inside two hoppers on each half of the planter use augers that are 45 1/2" long with a 1/4" hole in one end and 3/16" hole in the other. Install the augers so that the ends with the 1/4" holes are facing each other.



L.H. Side of Planter Shown

IMPORTANT: It may be necessary to turn the auger shaft around on two of the assemblies to get the proper rotation.

Step 12 -
Assemble Hopper Couplers. (Universal Joints)

Install the universal joint couplers between the two hoppers and secure to the auger shafts using 1/4" x 2" cotter pins. IMPORTANT: Check to see that the universal joints are in time.

Step 13 -
Assemble Hopper Couplers. (Standard Couplers)

Install the remaining couplers (and inserts) between hoppers and secure with 3/16" x 2" cotter pins. IMPORTANT: Check for correct auger rotation in each hopper.

Step 14 -
Assemble Hopper To Transmission Coupler.

Install the 4" coupler (See Illustration # 1) between the fertilizer transmission and outside auger. Attach the coupler to the transmission shaft with a 1/4" x 2" cotter pin. Align the coupler and tighten the four bolts that mount the auger drive bracket.

Step 15 -
Secure Hoppers.

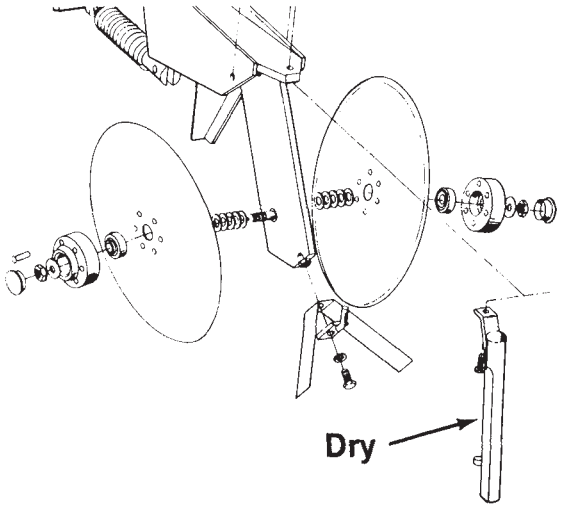
Secure hoppers to hopper mounts by installing two 1/2" x 1 1/4" cap screws, four flat washers, two lock washers and two hex nuts per hopper through slotted holes in hopper mount and hopper saddles. DO NOT OVER TIGHTEN HEX NUTS.

Step 16 -
Assemble Transmission Sprockets.

Install the desired sprocket combination on the fertilizer transmission and place the remaining sprockets on the storage mount and secure with lynch pin. (Illustration # 2) IMPORTANT: Always use one 1" machinery bushing on the side of the sprocket opposite the sprocket hub so that the proper chain alignment can be maintained.

Step 17 -
Assemble Fertilizer Openers.

Both the liquid and dry fertilizer attachments use the same 15" double disc openers. Attach drop tubes to each opener by positioning the bottom of the tube on the drop tube retainer and attaching the top of the tube with one 5/16" x 1 1/2" cap screw and lock nut.



The center two fertilizer openers on 30" and 36" row planters use a SPECIAL OPENER. These two openers have a specially designed external scraper that must be used to clear the tongue assembly when raising and lowering the planter. NOTE: This special opener is not used on 38" row planters.

Attach openers to the fertilizer bar so that blades are positioned no closer than two inches to the side of the row unit openers. When installing openers for dry fertilizer, position the opener on the side nearest the hopper outlet.

The down pressure springs are factory preset at 250 pounds down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment. Do not attempt to set opener depth with spring pressure. The opener is designed to **operate against the depth stop and spring up when encountering a foreign object or hard ground.**

CAUTION: Do not operate the double disc openers at full down pressure tension when planting in rocky ground. Chipping of the blades may occur.

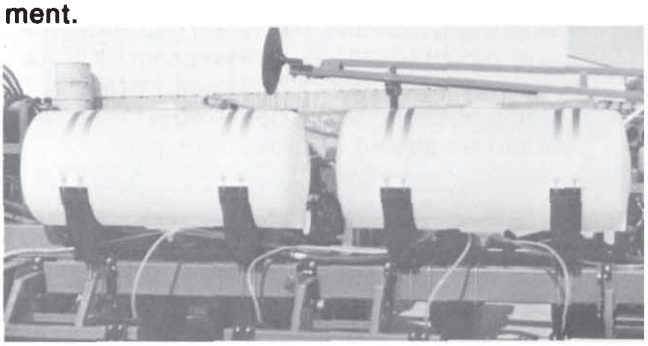
CAUTION: It is important after fertilizer package has been installed that you check to see that outside opener on right side of the planter will clear the transport post on the hitch when planter is rotated to transport position.

Step 18 -
Attach Rubber Drop Tubes.

Connect all fertilizer drop tubes between hopper outlets and opener drop tubes. Make sure tubes are straight and secure with hose clamps.

LIQUID FERTILIZER ATTACHMENT

The liquid fertilizer attachment is designed to be mounted on the front 5" x 7" tool bar of the Twin-Line planter. Each half of the planter has its own squeeze pump and drive system. There is only one quick fill and it is located on the left side of the tool bar with hoses leading to each tank and each squeeze pump. The 12 row and 16 row package mounts the same except for the additional opener mounts and openers. These setup instructions are for setting up one half of the package and must be repeated on the other half of the planter to complete the liquid fertilizer attachment.



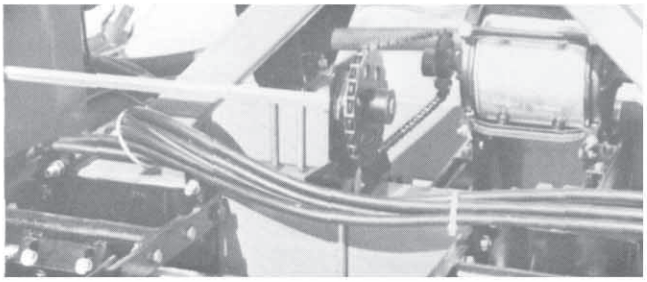
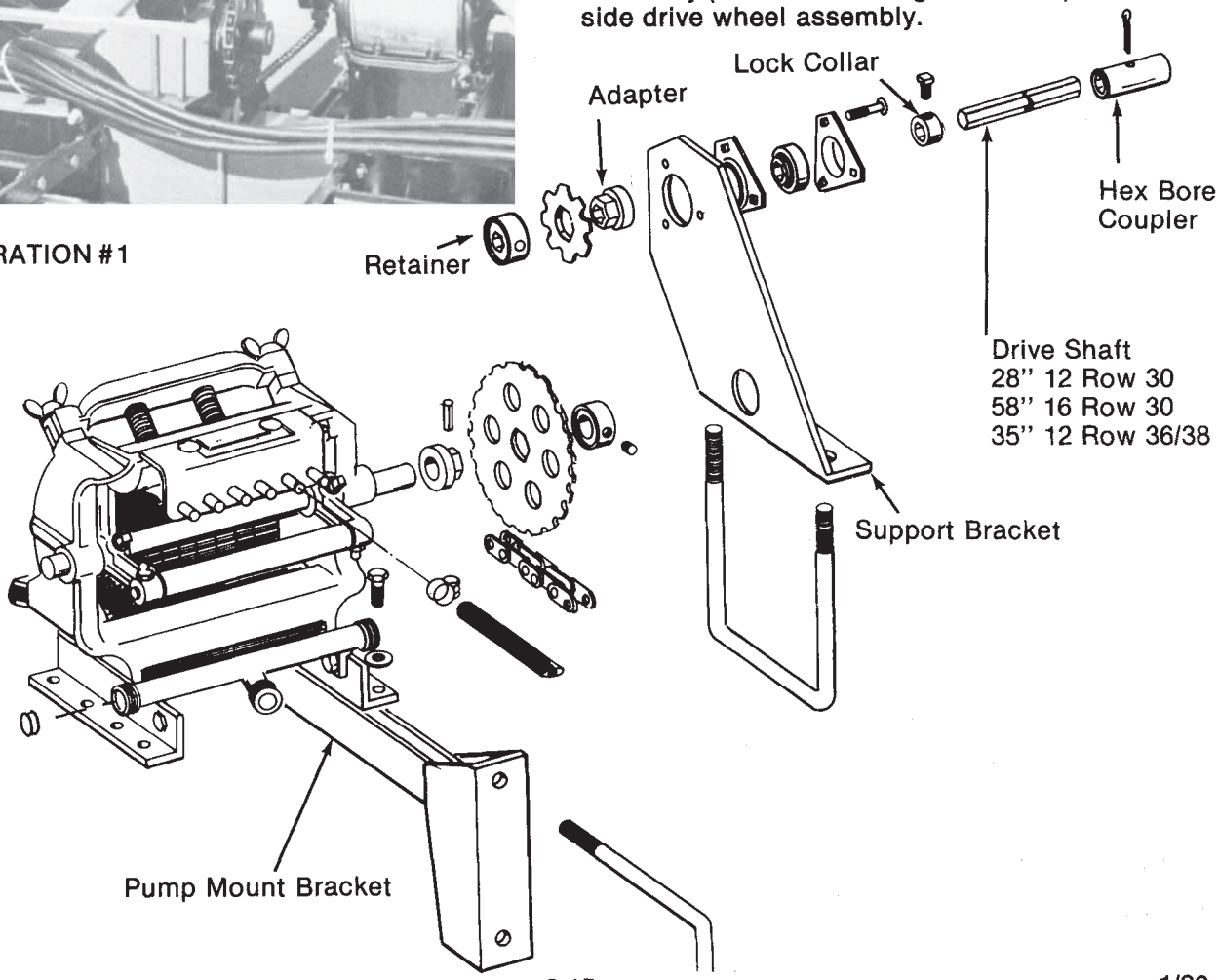


ILLUSTRATION #1

Step 1 -
Assemble Pump Drive Shaft And Support Bracket.
Install flangette bearing into drive support bracket using three 5/16" carriage bolts, lock washers and hex nuts. Do not tighten until support has been mounted and shaft installed. (See Illustration #1)

Install support bracket on the back 5" x 7" tool bar centered approxmately 25" in from the drive wheel assembly on the planter wing. (Inside drive wheel assembly on 16 row planters.) There is a left hand and right hand support bracket. Illustration #1 shows left hand installation. Attach with 5/8" x 7" x 5" U-bolt. Do not tighten until shaft and sprocket have been installed.

Remove 1/4" cotter pin and machinery bushing from the end of the main drive shaft. The main drive shaft runs from the row unit transmission through the drive wheel assembly. Install 7/8" x 1 3/4" hex bore coupler to the end of the main drive shaft and reinstall 1/4" cotter pin. NOTE: It may be necessary to remove the machinery bushing from the other side of the drive wheel assembly to install coupler. On the 16 row model, the pump drive shaft runs through the inside drive wheel assembly (Note: No bearings are used.) to the outside drive wheel assembly.



Install drive shaft through bearing in support bracket. Install hex lock collar and slide shaft into coupler on main drive shaft until shaft is secure. Install hex bore sprocket adapter to the end of the drive shaft as shown in Illustration #1 and tighten set screws. Install desired drive sprocket and lock in place with sprocket retainer and tighten set screws. Align shaft and tighten bearing/flangette carriage bolts and U-bolts. Slide hex lock collar against bearing/flangette on drive support bracket and tighten set screws.

Step 2 -
Assemble Squeeze Pump.

Install round bore adapter to pump shaft with roll pin and tighten set screws. Install the desired sprocket on squeeze pump and lock in place with sprocket retainer and tighten set screws.

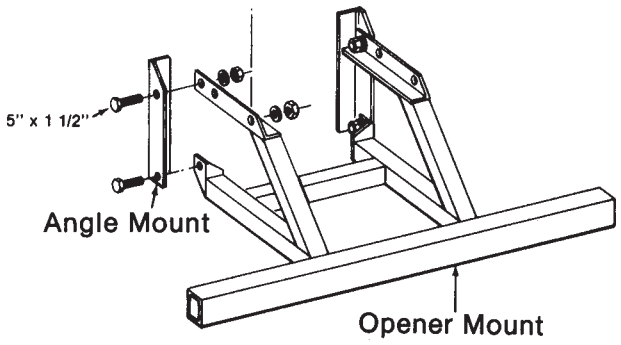
Install two of the squeeze pump mounting brackets to the BACK side of the FRONT tool bar **as shown in Illustration #1. These mounting brackets are attached using 5/8" x 5" x 7" U-bolts and should be attached so that the sprocket on the pump will line up with the drive sprocket. Do not tighten U-bolts until pump has been mounted, chain installed and alignment checked. See Illustration #4.**

Mount squeeze pump to the mounting brackets using four 7/16" x 3" cap screws, eight flat washers, four lock washers and four hex nuts. Install drive chain, align sprockets and tighten mounting bracket U-bolts. Slide pump forward until chain is tight and tighten pump to mounts.

Step 3 -
Assemble Angle Mounts to Opener Mounts.

Using 5/8" x 1 1/2" cap screws, bolt angle mounts to opener mounts as shown in Illustration #2.

ILLUSTRATION #2

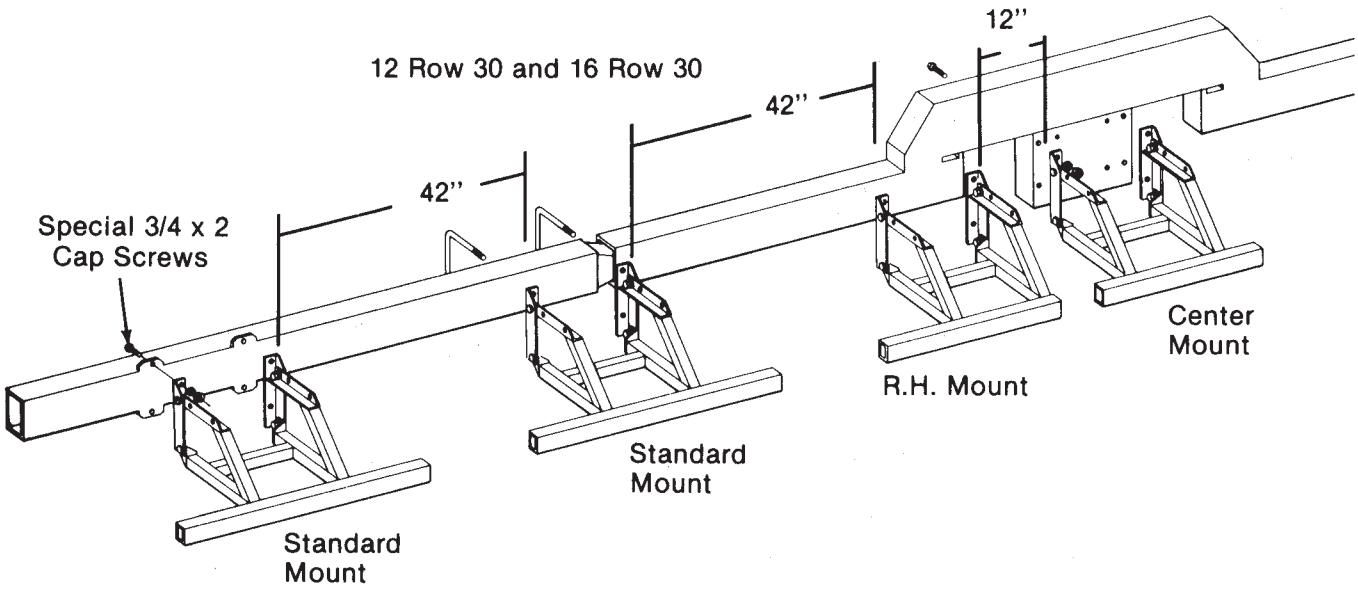


NOTE: On the 12 row 30 and 16 row 30 planter, one R.H. angle mount and one L.H. angle mount have smaller holes for mounting to the bar. These angle mounts are used on the center opener mount.

Step 4 -
Assemble Angle Mounts/Opener Mounts To Planter.

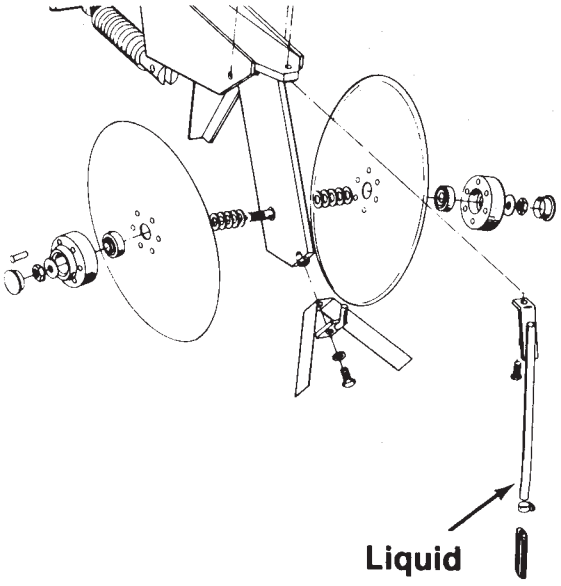
There are four different styles of opener mounts used. Illustration #3 shows the proper location of each. The center opener mount is bolted to the plate in the center of the planter using four 5/8" x 1 1/2" cap screws, lock washers and hex nuts. Mount the right hand mount to the right side of the tongue assembly with two inches between the tongue and opener bar. Attach the mount using two 3/4" x 5" x 7" U-bolts. Install the outside opener mount directly ahead of the wheel assembly using special 3/4" x 2" cap screws, lock washers and hex nuts. (There are two additional opener mounts installed in this manner on 16 row models.) Using 3/4" x 5" x 7" U-bolts, install the remaining opener mounts centered 60" in on the tool bar as shown in Illustration #3.

ILLUSTRATION #3



Step 5 -
Assemble Fertilizer Openers.

Both the liquid and dry fertilizer attachments use the same 15" double disc openers. Attach drop tubes to each opener by positioning the bottom of the tube on the drop tube retainer and attaching the top of the tube with one 5/16" x 1 1/2" cap screw and lock nut. Attach liquid drop tube extension using hose clamp before mounting drop tube to opener.



The center two fertilizer openers on 30" and 36" row planters use a SPECIAL OPENER. These two openers have a specially designed external scraper that must be used to clear the tongue assembly when raising and lowering the planter. NOTE: This special opener is not used on 38" row planters.

Attach openers to the fertilizer bar so that blades are positioned no closer than two inches to the side of the row unit openers.

The down pressure springs are factory preset at 250 pounds down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a 15/16" wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment. Do not attempt to set opener depth with spring pressure. The opener is designed to **operate against the depth stop and spring up when encountering a foreign object or hard ground.**

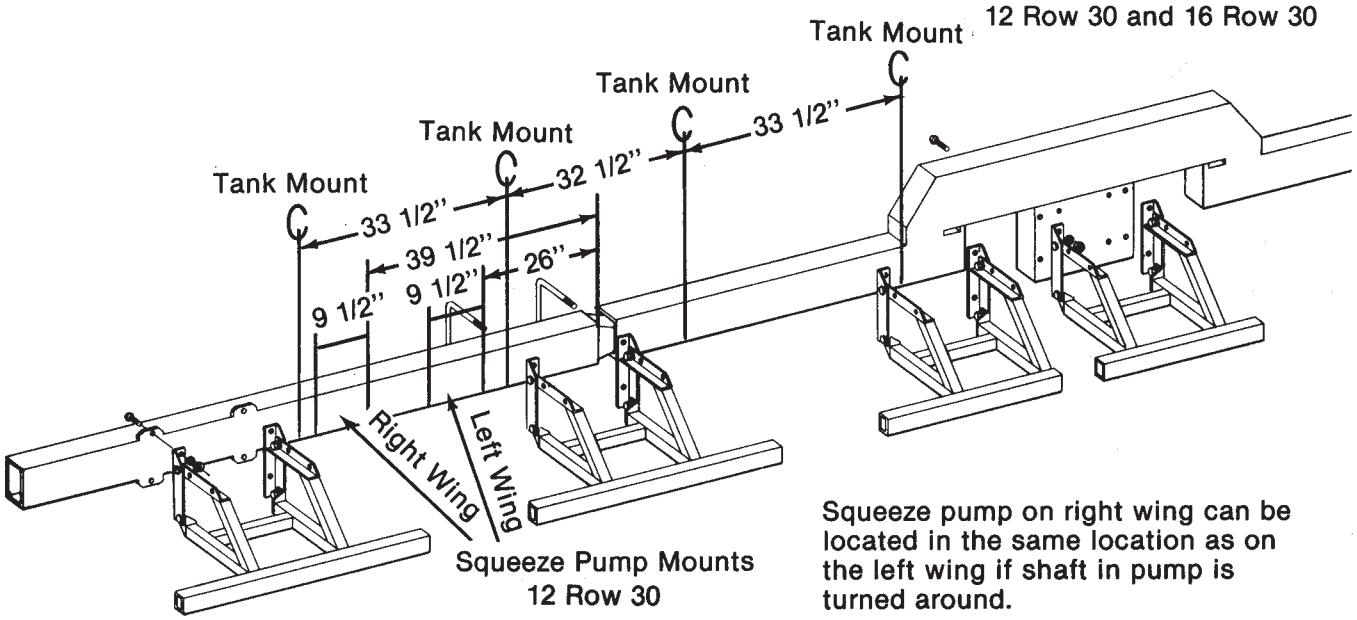
CAUTION: Do not operate the double disk openers at full down pressure tension when planting in *rocky ground. Chipping of the blades may occur.*

CAUTION: It is important after fertilizer package has been installed that you check to see that outside opener on right side of planter will clear the transport post on the hitch when planter is rotated to transport position.

Step 6 -
Assemble Tank Mounts.

Install tank mounts using two 5/8" x 7" x 5" U-bolts per mount. Mounts should be centered 33 1/2 inches apart. See Illustration #4 for approximate locations on bar. The tank on the wing should be mounted close to the wing pivot. This will keep as much of the weight on the main frame as possible.

ILLUSTRATION #4

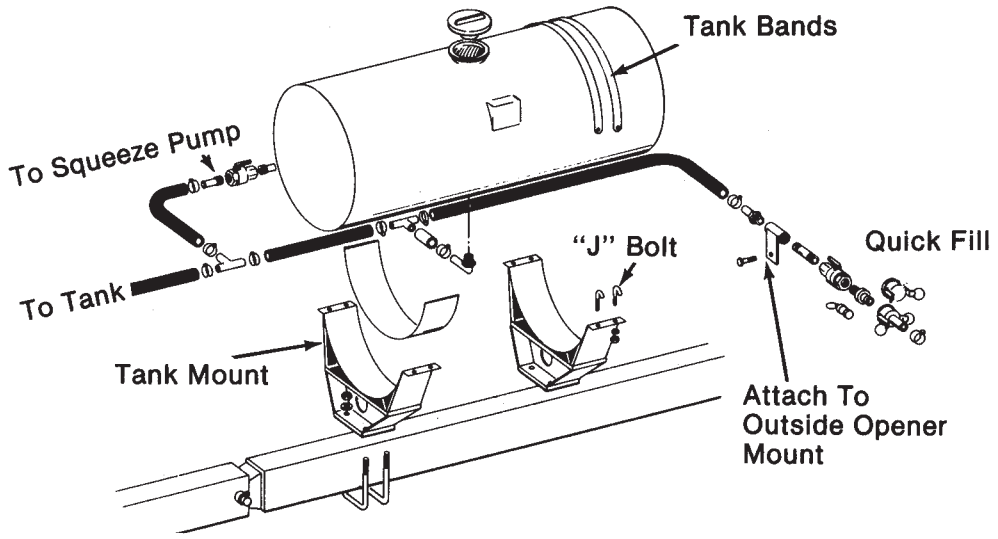


CAUTION: Six inches between the tanks must be maintained to insure that the tanks won't hit each other when wing flexes up in field operation.

Step 7 -
Mount Tanks.

Install tank pads and center tanks between mounts and attach with four tank bands per tank. Install using 5/16" "J" bolts and lock nuts. Tighten evenly.

ILLUSTRATION #5



Step 8 -
Assemble Hoses and Fittings.

Install fittings and hoses as shown in Illustration #5. Use pipe compound or teflon tape on 90° elbow under tanks and on quick fill fittings. Quick fill is designed to be attached to the opener mount at the left end of the planter. Cut 1 1/4" hose to proper lengths and install using #24 hose clamps. Note the location of the hose to the squeeze pump in Illustration #1. The 1 1/4" hose attaches to the end port on the squeeze pump intake manifold. Plug the two remaining ports with the rubber plugs in the squeeze pump package. Rotating the plug as it is being installed will make the plug seat tighter.

Install 1/2" hoses between squeeze pump and openers.

Routing both the 1 1/4" tank hose and the 1/2" opener hoses through the round holes in the tank mount will protect the hoses and will improve the appearance of the installation. Use ties on the 1/2" hoses where needed.

Step 9 -
Store Unused Sprockets.

Using 1/2" x 2" cap screw attach unused pump sprockets to hole in opener mount. Secure with 5/8" flat washer, 1/2" flat washer, 1/2" lock washer and hex nut.

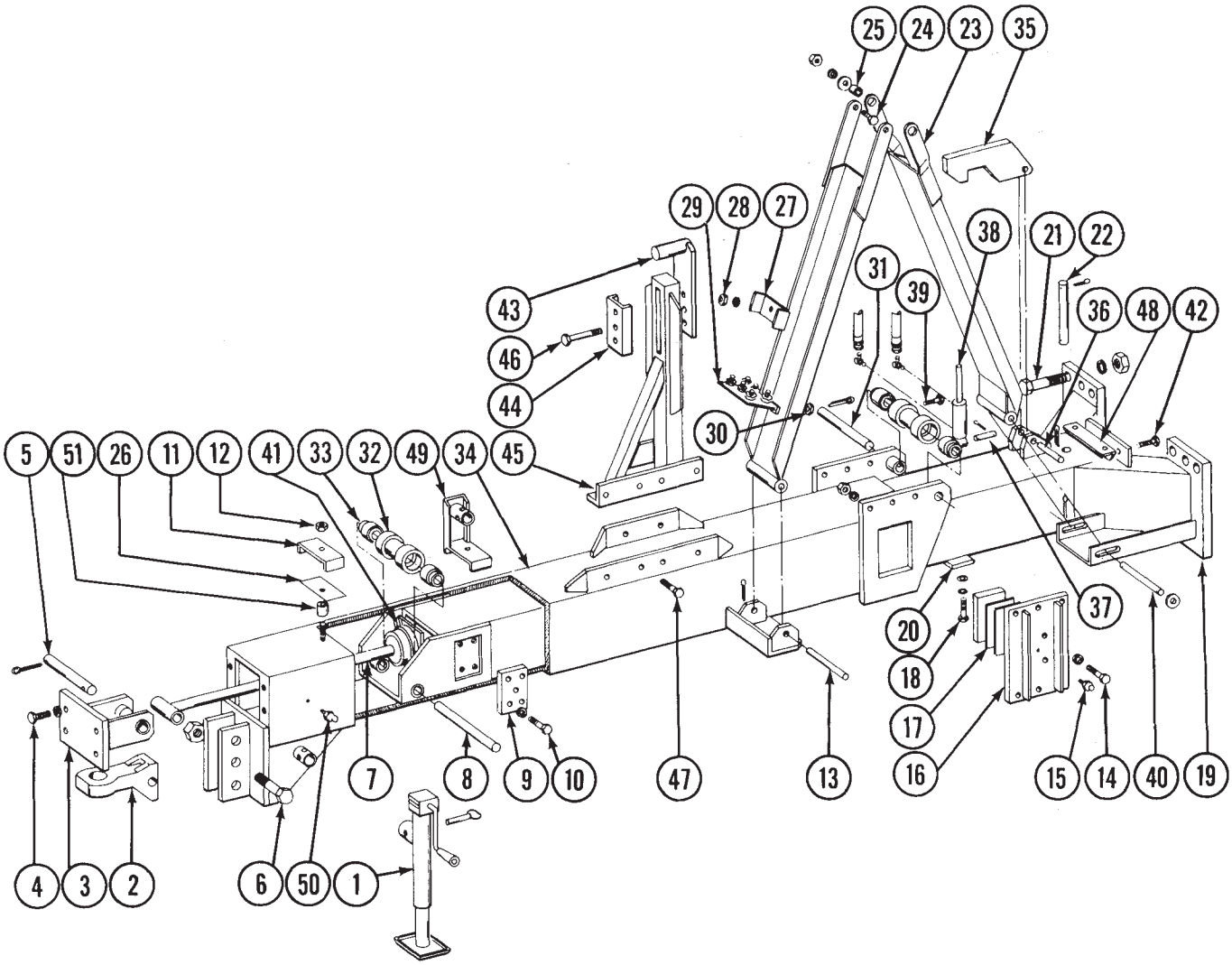
FINAL INSPECTION

- ☐ Lubricate per instructions.
- ☐ Check for loose hydraulic hoses and fittings.
- ☐ Check for loose bolts, nuts, etc.
- ☐ Check all drive chains for proper alignment and tension.
- ☐ Make sure all drive shafts rotate freely and do not bind.
- ☐ Make sure all row units are mounted properly and that they are squared on the frame.
- ☐ Cycle all hydraulics to ensure all the air has been purged from the hydraulic system.

Parts List Index

Hitch Assembly P2,P 3
Center Frame Assembly P4
Lift Arms, Upper and Lower P5
Axle and Pivot Assembly P6, P7
8 Bolt Transport Wheel Assembly, 12 Row 30 ..... P8
8 Bolt Transport Wheel Assembly, 12 Row Wide P9
8 Bolt Transport Wheel Assembly, 16 Row 30 ..... P10
Wing Assembly With Lift Arm, 12 Row 30 and 12 Row Wide P11
Wing Assembly With Lift Arms, 16 Row 30 ..... P12
Lift Wheel Assembly P13
Contact Drive Wheel and Arm Assembly P14, P15
Drive Line, 12 Row 30 and 12 Row Wide P16
Drive Line, 16 Row 30 ..... P17
Extended Drill Sprocket Package P18
Transmission Assembly P19
Drill Shaft Drive Line, Wing Section P20
Drill Shaft Drive Line, Center Section P21
Transport Latch Assembly P22
Low Profile Double Fold Marker Assembly P23
Marker Hub Assembly P24
Hydraulic System, Marker, 12 Row 30 and Wide P25
Hydraulic System, Rotate to Transport, 12 Row 30 and Wide P26, P27
Hydraulic System, Planter Lift, 12 Row 30 and Wide P28
Hydraulic System, Marker, 16 Row 30 ..... P29
Hydraulic System, Rotate to Transport, 16 Row 30 ..... P30, P31
Hydraulic System, Planter Lift, 16 Row 30 ..... P32
Manifold, Outer Bell P33
Valve Block, Located on Main Frame P34
Valve Block, Located on Hitch P35
Solenoid Valve P36
Flow Control Valve P36
Pressure Relief Valve P36
Actuator P37
Three Valve Electrical Kit P38
Rotation Cylinder P39
Tongue Lock Cylinder P39
Lift Lock Cylinder P39
Marker Cylinder P40
Wing Lock Cylinder P40
Tongue Cylinder, 12 Row 30 ..... P40
Tongue Cylinder, 12 Row Wide P41
Tongue Cylinder, 16 Row 30 ..... P41
Wing Lift Cylinder, 12 Row 30 and Wide P42
Wing Lift Cylinder, 16 Row 30 ..... P42
Center Section Lift Cylinder P43
Push Unit Drive and Transmission Assembly P44, P45
Push Unit Drill Shaft Drive Line P46, P47
Fertilizer Opener P48, P49
Opener Mounts P50
Dry Fertilizer Couplers and Hopper Mount P51
Dry Fertilizer Transmission and Drive Line P52, P53
Dry Fertilizer Hopper P54
Liquid Fertilizer Squeeze Pump, 12 Row P55
Liquid Fertilizer Squeeze Pump, 16 Row P56
Liquid Fertilizer Tanks, Saddles, Hoses and Fittings P57
Squeeze Pump Mounting Brackets, Sprocket and Adapter Package and Drive Line P58, P59
Decals, Reflectors and Tie Straps P60, P61
Numerical Index, Parts Section ..... a

HITCH ASSEMBLY

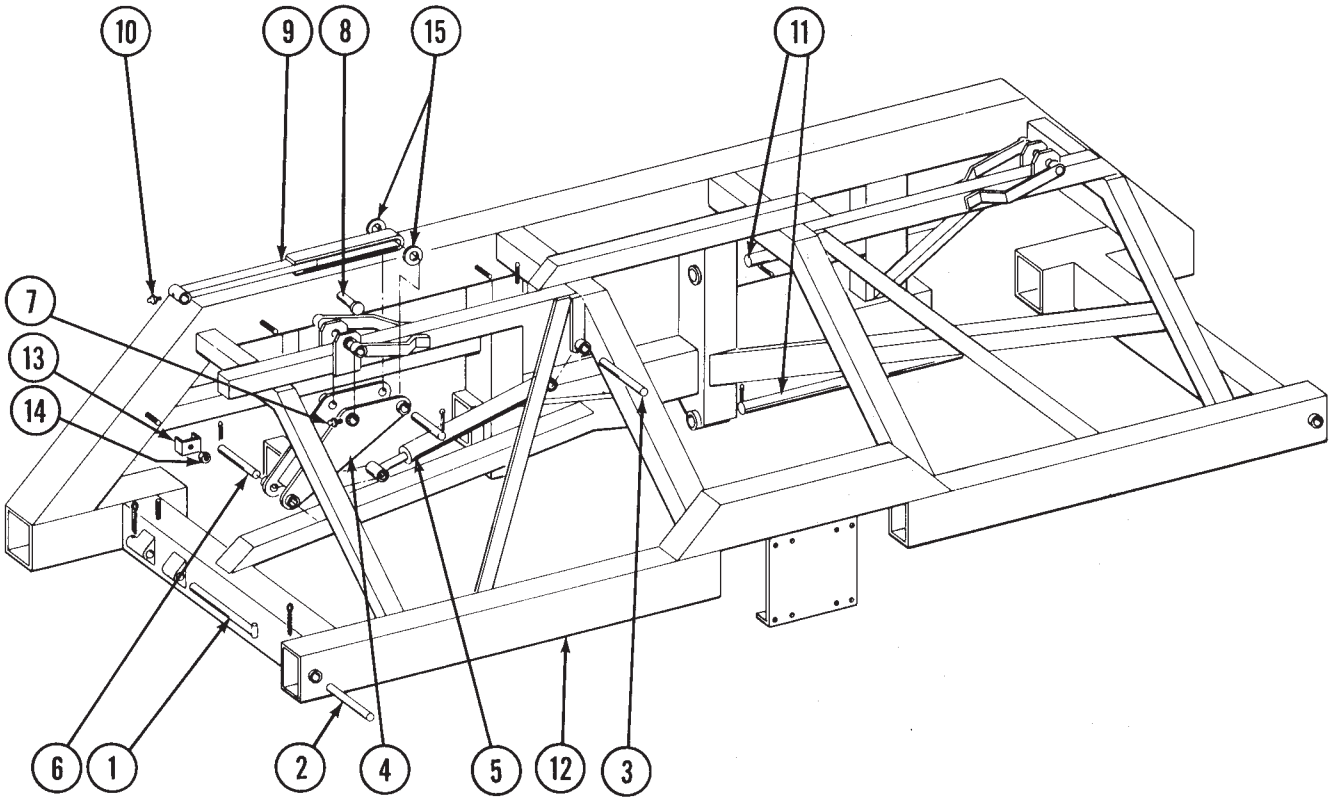


ITEM	PART NO.	DESCRIPTION
1.	A0941	Jack Assembly
	R0517	Pin
	R0516	Crank Assembly
	R0515	Bevel Gears
2.	D0558	Clevis, Single
3.	A2596	Cylinder Mount
4.	10007	HHCS, 5/8"-11 x 1 1/2"
	10230	Lock Washer, 5/8"
5.	D3550	Pin, 1 1/4" x 5 5/8"
	10460	Cotter Pin, 1/4" x 2"
6.	10169	HHCS, 1 1/4"-7 x 6"
	10157	Lock Nut, 1 1/4"-7
7.		Cylinder, See Tongue Cylinder Page
8.	D3537-1	Shaft, 1 1/4" x 8 1/2"
9.	D3478	Wear Plate, Bronze
10.	10014	HHCS, 1/2"-13 x 1"
	10228	Lock Washer, 1/2"
11.	D3548	Clamp, Hose
12.	10111	Lock Nut, 1/2"-13
13.	D3561	Pin, 1 1/4" x 9 1/8"
	10460	Cotter Pin, 1/4" x 2"
14.	10016	HHCS, 1/2"-13 x 2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2"-13
15.	10641	Grease Fitting, 1/8" NPT
16.	A2653	Retainer Assembly
17.	D3501	Shim

HITCH ASSEMBLY

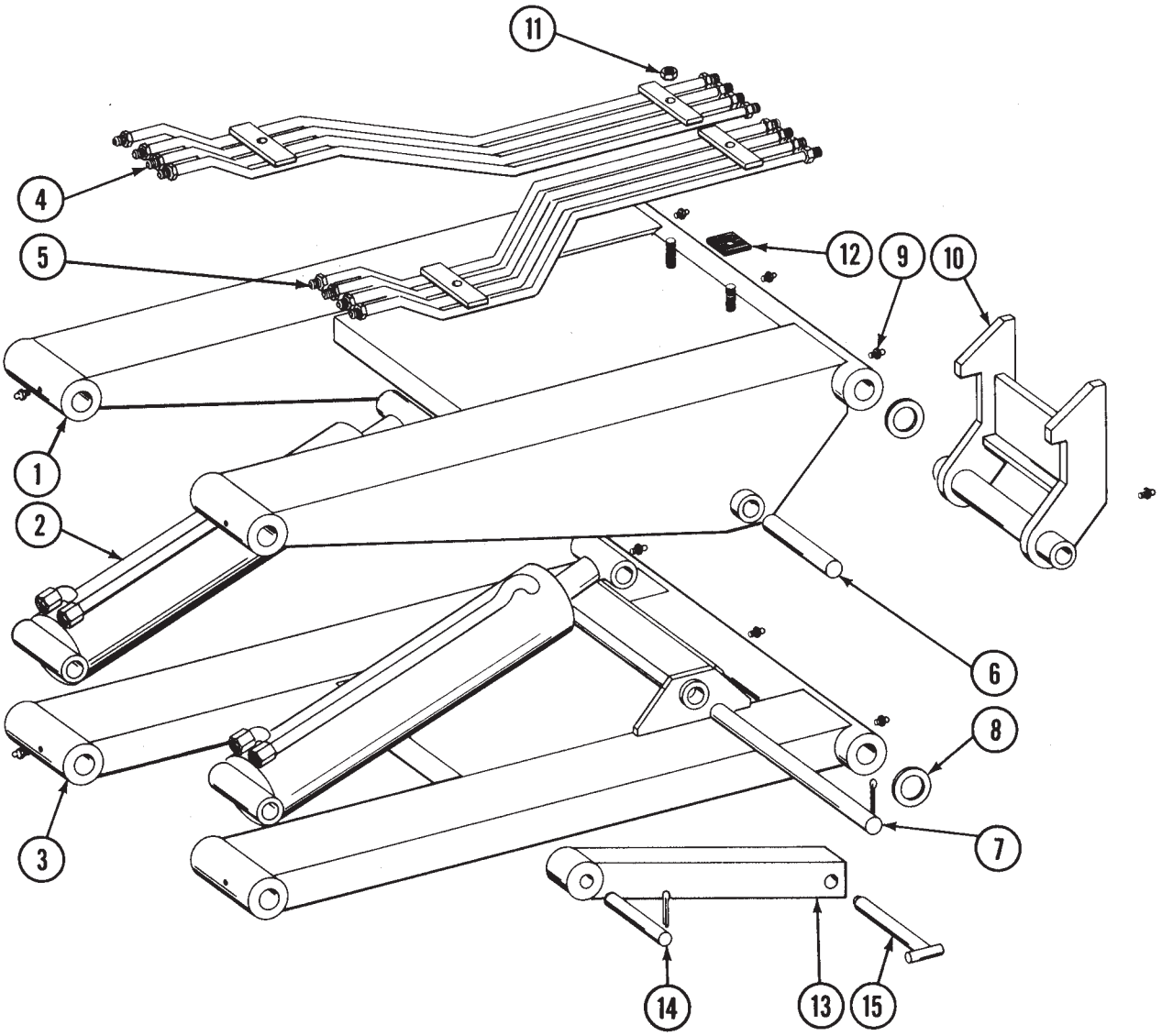
ITEM	PART NO.	DESCRIPTION
18.	10014	HHCS, 1/2"-13 x 1"
	10228	Lock Washer, 1/2"
	10216	Washer, 1/2" USS
19.	A3483	Inner Hitch, 12 Row 30
	A3736	Inner Hitch, 12 Row Wide
	A3500	Inner Hitch, 16 Row 30
20.	D3488	Shim, 5" x 6 1/2" x 1/2"
21.	10076	HHCS, 1"-8 x 3 1/2"
	10118	Lock Washer, 1"
	10117	Hex Nut, 1"-8
22.	D2168	Pin, 1 1/4" x 9 3/4"
	10460	Cotter Pin, 1/4" x 2"
23.	A2628	Carrier, Hose Take-up, 12 Row 30
	A2816	Carrier, Hose Take-up, 12 Row Wide and 16 Row 30
24.	D4695	HHCS, Special 5/8"-11
	10230	Lock Washer, 5/8"
	10217	Washer, 5/8" USS
	10104	Hex Nut, 5/8"-11
25.	B0123	Bushing
26.	D3552	Strip, Rubber
27.	D3560	Clamp, Hose
28.	10108	Lock Washer, 3/8"-16
29.	A2627	Bulkhead, Less Fittings
30.	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2"-13
31.	D3547	Shaft, 1 1/4" x 12 3/4"
	10460	Cotter Pin, 1/4" x 2"
32.	A2597	Roller
33.	A2565	Bearing-Ball, Adaptor
34.	A3484	Outer Hitch, 12 Row 30
	A3737	Outer Hitch, 12 Row Wide
	A3501	Outer Hitch, 16 Row 30
35.	A3489	Tongue Lock
36.	D3633	Pin, 1 1/4" x 3 3/4"
	10460	Cotter Pin, 1/4" x 2"
37.	D3637	Pin, 3/4" x 3"
	10457	Cotter Pin, 5/32" x 1 1/2"
38.		Cylinder, See Tongue Lock Cylinder Page
39.	10325	HHCS, 3/8" x 2 3/4"
	10108	Lock Nut, 3/8" -16
40.	D2168	Pin, 1 1/4" x 9 3/4"
	10139	Washer, 1 1/4" USS
	10460	Cotter Pin, 1/4" x 2"
41.	A2600	Stabilizer, 12 Row 30
	A2807	Stabilizer, 12 Row Wide and 16 Row 30
	10003	HHCS, 3/8" - 16 x 1 1/2"
	10108	Lock Nut, 3/8" - 16
42.	10001	HHCS, 3/8" - 16 x 1"
	10108	Lock Nut, 3/8" - 16
43.	A3576	Post, Transport Latch, Standard
	A3671	Post, Transport Latch, For Use With Ridge Til
44.	D3856	Bracket
45.	A2737	Mount
46.	10050	HHCS, 3/4" - 10 x 5"
	10231	Lock Washer, 3/4"
	10105	Hex Nut, 3/4" - 10
47.	10005	HHCS, 5/8" - 11 x 1 3/4"
	10217	Washer, 5/8" USS
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
48.	D3797	Angle
49.	A2749	Bracket, Jack Mount
50.	10640	Grease Fitting, 1/4"-28
51.	D3788-01	Tubing, Plastic

CENTER FRAME ASSEMBLY, 12 Row 30 thru 16 Row 30



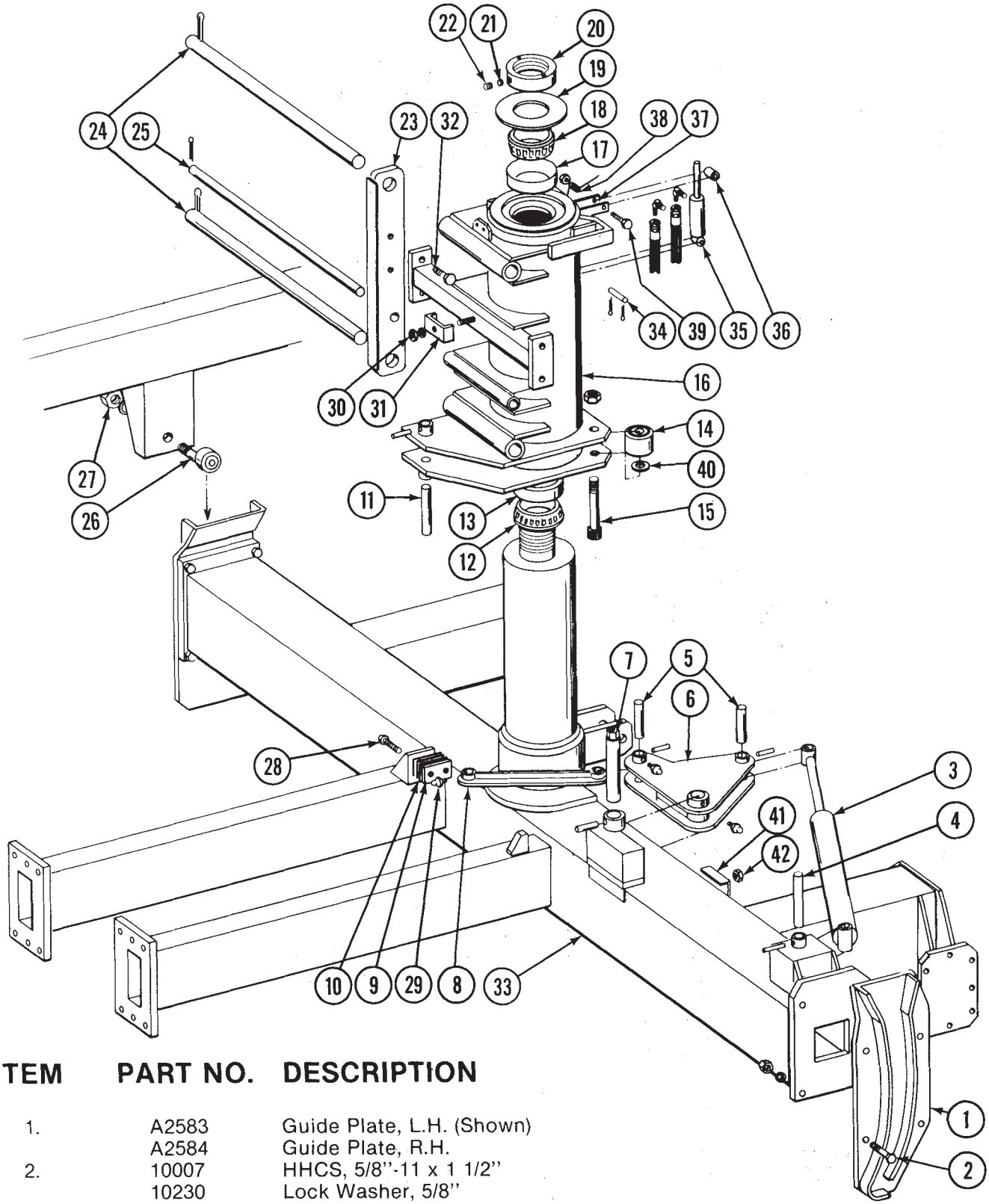
ITEM	PART NO.	DESCRIPTION
1.	A2620	Pin, 1 1/4" x 10 3/4"
	10460	Cotter Pin, 1/4" x 2"
2.	D3531	Pin, 1 1/4" x 9 1/4"
	10460	Cotter Pin, 1/4" x 2"
3.	D1701	Pin, 1 1/4" x 6 1/2"
	10460	Cotter Pin, 1/4" x 2"
4.	A3429	Plate, Toggle
5.		Cylinder, See Wing Lock Cylinder Page
6.	D4108	Pin, 1 1/4" x 7"
	10460	Cotter Pin, 1/4" x 2"
7.	10641	Grease Fitting, 1/8" NPT
8.	A2621	Pin, 1 1/4" x 3 1/8"
	10460	Cotter Pin, 1/4" x 2"
9.	A3400	Link, 12 Row 30 and 16 Row 30
	A3730	Link, 12 Row Wide
10.	10640	Grease Fitting, 1/4"-28
11.	D3526	Pin, 2 1/8" x 41 1/2"
	10461	Cotter Pin, 3/8" x 3"
12.	A3096	Center Frame, 12 Row 30
	A3749	Center Frame, 12 Row Wide
	A3508	Center Frame, 16 Row 30
13.	D3710	Clamp, Hose
14.	10111	Lock Nut, 1/2" - 13
15.	D4171	Washer, 1 1/4", Hardened

LIFT ARMS, UPPER AND LOWER



ITEM	PART NO.	DESCRIPTION
1.	A2615	Upper Parallel Arm, 12 Row 30 thru 12 Row Wide
	A2775	Upper Parallel Arm, 16 Row 30
2.		Cylinder, See Center Section Lift Cylinder Page
3.	A2696	Lower Parallel Arm, 12 Row 30 thru 12 Row Wide
	A2783	Lower Parallel Arm, 16 Row 30
4.	A2582	Tube Assembly, R.H.
5.	A2581	Tube Assembly, L.H.
6.	D3421	Pin, 1 1/4" x 8 3/4"
	10460	Cotter Pin, 1/4" x 2"
7.	D3606	Pin, 1 1/4" x 18 1/4"
	10460	Cotter Pin, 1/4" x 2"
8.	10234	Machinery Bushing, 2 1/8", 10 Gauge
	10336	Machinery Bushing, 2 1/8", 16 Gauge
9.	10641	Grease Fitting, 1/8" NPT
10.	A2694	Lock
11.	10111	Lock Nut, 1/2"
12.	D3773	Strip, Rubber
13.	A2736	Lockup
14.	D1701	Pin, 1 1/4" x 6 1/2"
	10460	Cotter Pin, 1/4" x 2"
15.	A2997	"T" Pin
	10671	Hair Pin Clip, No. 6

AXLE AND PIVOT ASSEMBLY

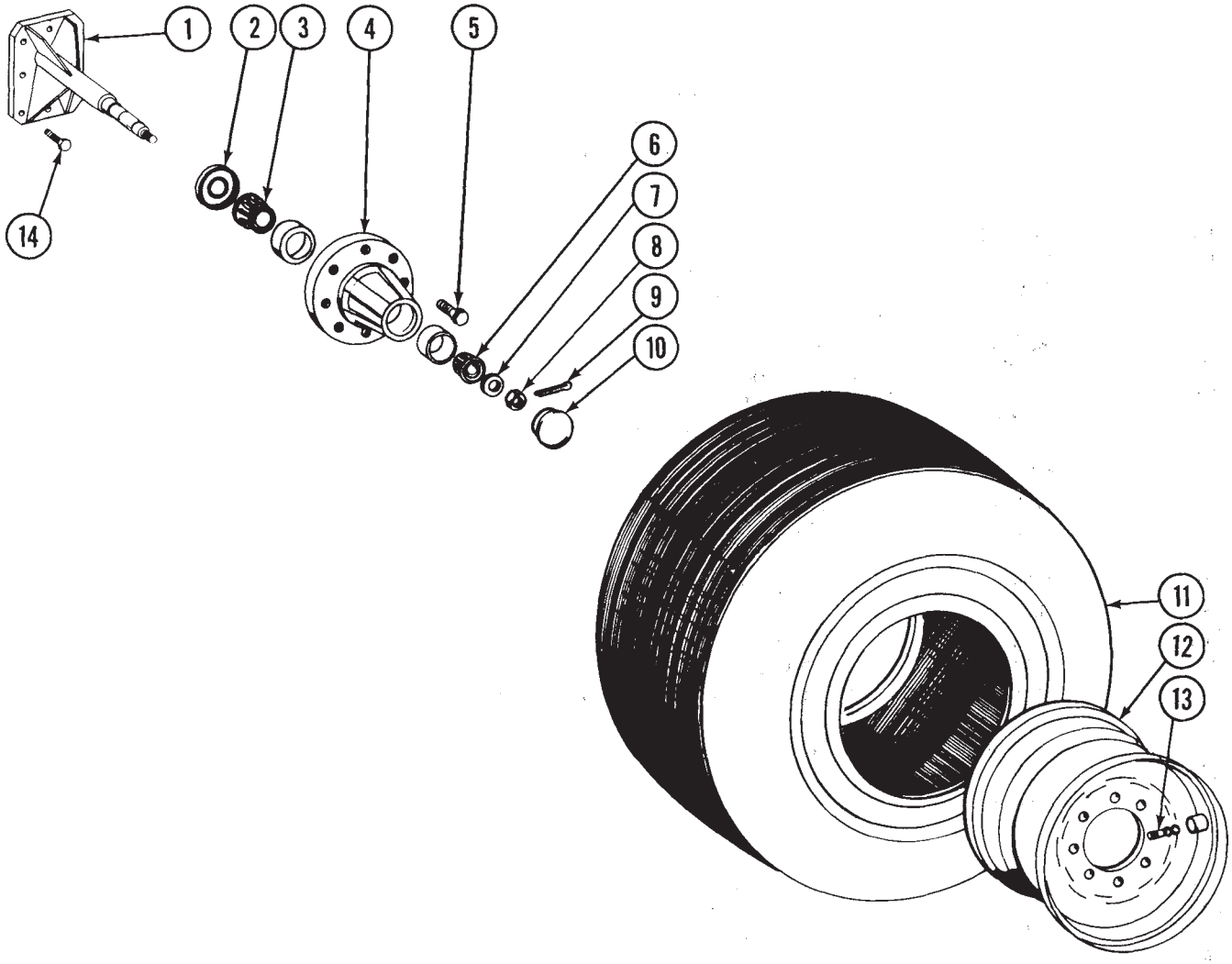


ITEM	PART NO.	DESCRIPTION
1.	A2583	Guide Plate, L.H. (Shown)
	A2584	Guide Plate, R.H.
2.	10007	HHCS, 5/8"-11 x 1 1/2"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8"-11
3.		Cylinder, See Rotation Cylinder Page
4.	D3394	Pin, 1 1/4" x 6 1/2"
	10610	Roll Pin, 3/8" x 2"
	10332	Spring Pin, 7/32" x 2"
5.	D3403	Pin, 1 1/4" x 4 1/2"
	10610	Spring Pin, 3/8" x 2"
	10332	Spring Pin, 7/32" x 2"

AXLE AND PIVOT ASSEMBLY

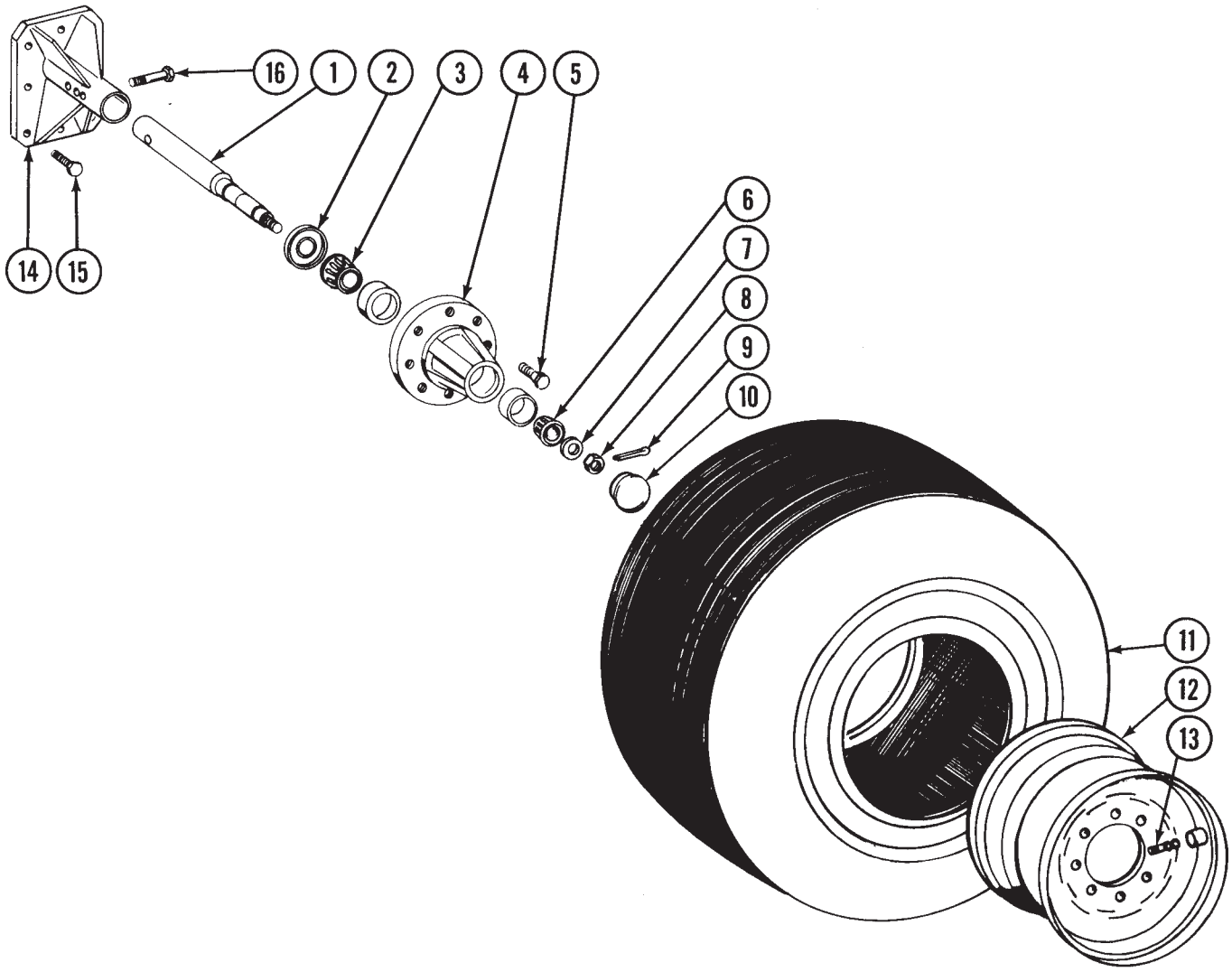
ITEM	PART NO.	DESCRIPTION
6.	A3504	Plate, Toggle w/Bushing
	D4468	Bushing, Spring
7.	A2573	Pin
	10293	Roll Pin, 3/8" x 3"
	10333	Spring Pin, 7/32" x 3"
8.	A2592	Link Assembly w/Bushings
	D4467	Bushing, Spring
9.	D3389	Tap Block
10.	D3398	Shim
11.	D3404	Pin, 1 1/4" x 5 1/2"
	10610	Roll Pin, 3/8" x 2"
	10332	Spring Pin, 7/32" x 2"
12.	A2508	Bearing Cone
13.	D3239	Bearing Cup
14.	A2567	Cam Follower
15.	D3443	Bolt, Special, 1"-8 x 5"
	10118	Lock Washer, 1"
	10082	Washer, 1" SAE
	10117	Hex Nut, 1"-8
16.	A3472	Outer Bell
17.	D3302	Bearing Cup
18.	A2520	Bearing Cone
19.	D3238	Washer
20.	D3237	Nut, Spanner
21.	D3452	Insert, Nylon
22.	10264	Hex Socket Set Screw, Cup Point, 1/2"-13 x 1/2"
23.	A2614	Brace Bar
24.	D3275	Pin, 2 1/8" x 30 1/2"
	10461	Cotter Pin, 3/8" x 3"
25.	D3527	Pin, 1 1/4" x 30 1/4", Cylinder
	10468	Cotter Pin, 3/8" x 2"
26.	A2566	Cam Follower
27.	10139	Washer, 1 1/4" USS
	10281	Hex Nut, 1 1/4" NF
28.	10016	HHCS, 1/2" - 13 x 2"
	10228	Lock Washer, 1/2"
29.	10641	Grease Fitting, 1/8" NPT
30.	10111	Lock Nut, 1/2"-13
31.	D3711	Clamp, Hose
32.	10025	HHCS, 3/4"-10 x 1 1/2"
	10231	Lock Washer, 3/4"
33.	A3094	Axle/Pivot Tube, 12 Row 30
	A3744	Axle/Pivot Tube, 12 Row Wide
	A3498	Axle/Pivot Tube, 16 Row 30
34.	D3637	Pin, 3/4" x 3"
	10457	Cotter Pin, 5/32" x 1 1/2"
35.		Cylinder, See Lift Lock Cylinder Page
36.	D2971-01	Sleeve, 1 1/8"
37.	D2971-03	Sleeve, 7/16"
38.	D3751	Spring
39.	10325	HHCS, 3/8"-16 x 2 3/4"
	10108	Lock Nut, 3/8"-16
40.	10345	Machinery Bushing, 1", 14 Gauge
41.	D2357	Clamp, Hose
42.	10108	Lock Nut, 3/8" -16

8 BOLT TRANSPORT WHEEL ASSEMBLY 12 Row 30



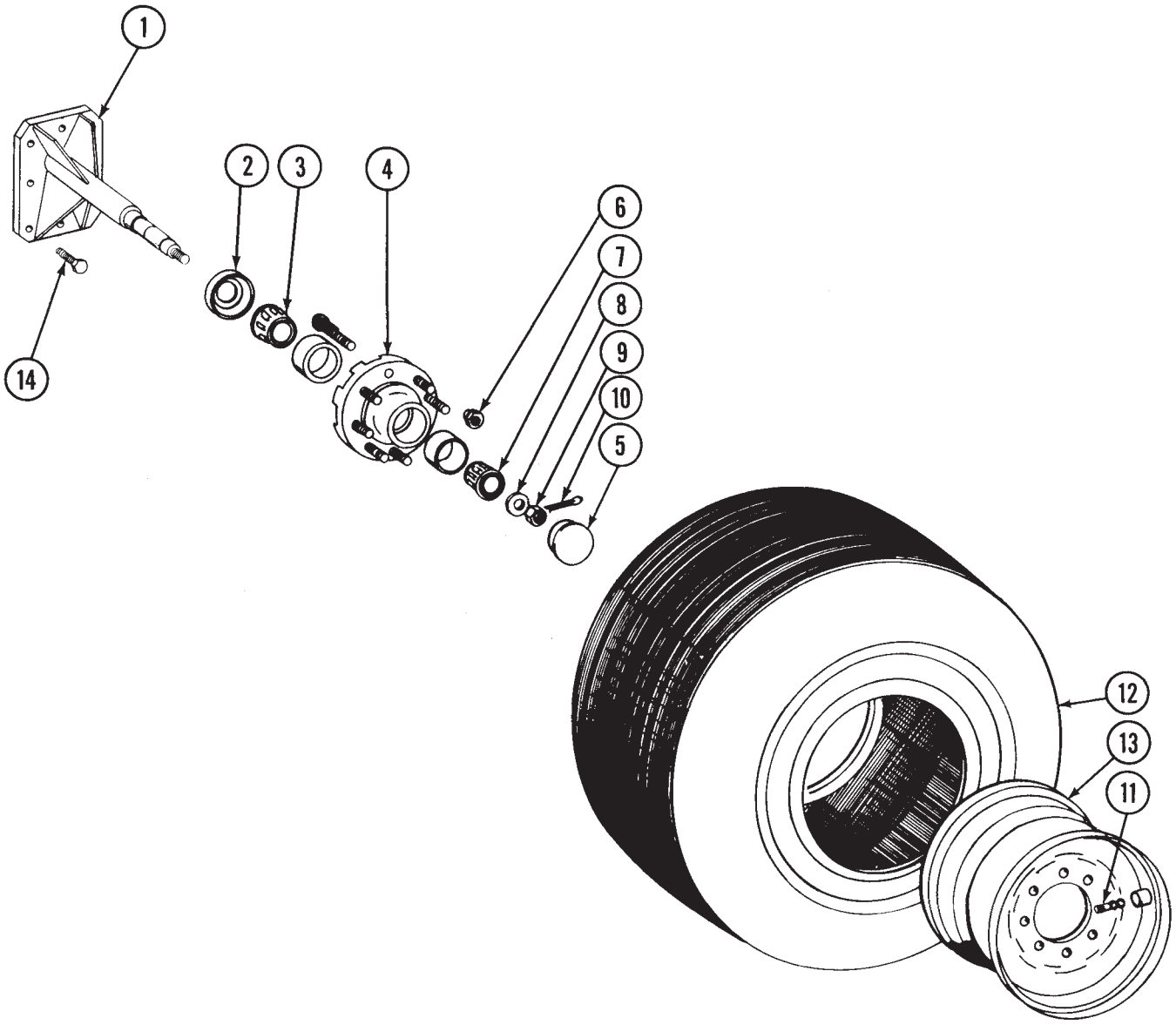
ITEM	PART NO.	DESCRIPTION
1.	A3466	Spindle
2.	A0867	Seal
3.	A0866	Bearing Cone
4.	A0513	Hub w/Cups, Less Bolts
	R0296	Cup, Inner
	R0522	Cup, Outer
5.	R0270	Bolt, 9/16"-18 x 1 3/16"
6.	A0865	Bearing Cone
7.	10084	Spindle Washer, 7/8"
8.	10083	Hex Slotted Nut, 7/8"-14
9.	10459	Cotter Pin, 3/16" x 1 1/2"
10.	D1741	Cap
11.	D1966	Tire, 14L x 16.1
12.	A3568	Wheel, W11C x 16.1
13.	D1166	Valve Stem
14.	10026	HHCS, 3/4" - 10 x 2"
	10231	Lock Washer, 3/4"
	10105	Hex Nut, 3/4" - 10
A.	A1235	Hub Assembly (Includes Items 2 thru 10)

8 BOLT TRANSPORT WHEEL ASSEMBLY 12 Row Wide



ITEM	PART NO.	DESCRIPTION
1.	D1354	Spindle
2.	A0867	Seal
3.	A0866	Bearing Cone
4.	A0513	Hub w/Cups, Less Bolts
	R0296	Cup, Inner
	R0522	Cup, Outer
5.	R0270	Bolt, 9/16"-18 x 1 3/16"
6.	A0865	Bearing Cone
7.	10084	Spindle Washer, 7/8"
8.	10083	Hex Slotted Nut, 7/8"-14
9.	10459	Cotter Pin, 3/16" x 1 1/2"
10.	D1741	Cap
11.	D1966	Tire, 14L x 16.1
12.	A3568	Wheel, W11C x 16.1
13.	D1166	Valve Stem
14.	A3763	Mount
15.	10026	HHCS, 3/4" - 10 x 2"
	10231	Lock Washer, 3/4"
	10105	Hex, Nut, 3/4" - 10
16.	10036	HHCS, 5/8 - 11 x 4"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
A.	A1235	Hub Assembly (Includes Items 2 thru 10)

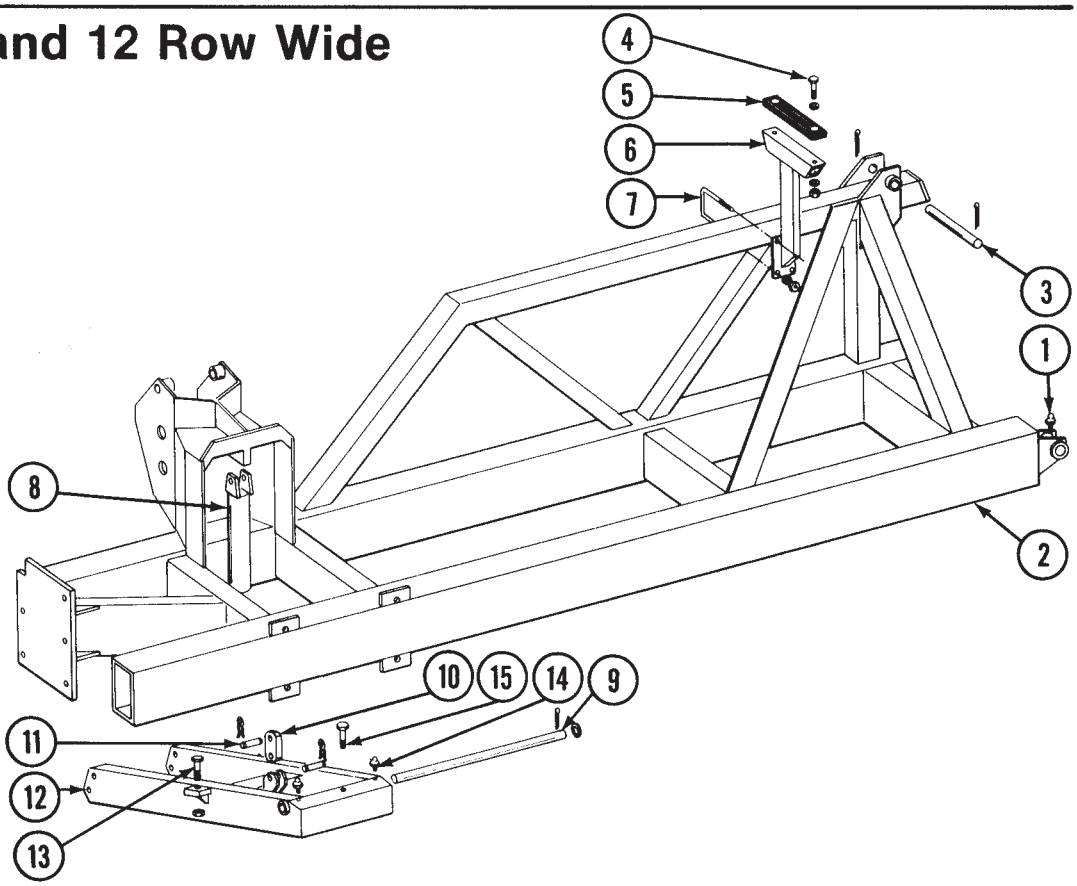
8 BOLT TRANSPORT WHEEL ASSEMBLY 16 Row 30



ITEM	PART NO.	DESCRIPTION
1.	A3579	Spindle
2.	A1308	Seal
3.	A1309	Bearing Cone
4.	A1295	Hub w/Cups and Bolts
	R0529	Cup, Inner
	R0189	Cup, Outer
	R0528	Bolt
5.	D2310	Cap
6.	R0531	Lug Nut, 5/8" - 18
7.	A0238	Bearing Cone
8.	10082	Washer, 1" SAE
9.	10146	Hex Slotted Nut, 1" - 14
10.	10462	Cotter Pin, 3/16" x 2"
11.	D1166	Valve Stem
12.	D1966	Tire, 14L x 16.1
13.	A3568	Wheel, W11C x 16.1
14.	10026	HHCS, 3/4" - 10 x 2"
	10231	Lock Washer, 3/4"
	10105	Hex Nut, 3/4" - 10
A.	A1322	Hub Assembly (Includes Items 2 thru 10)

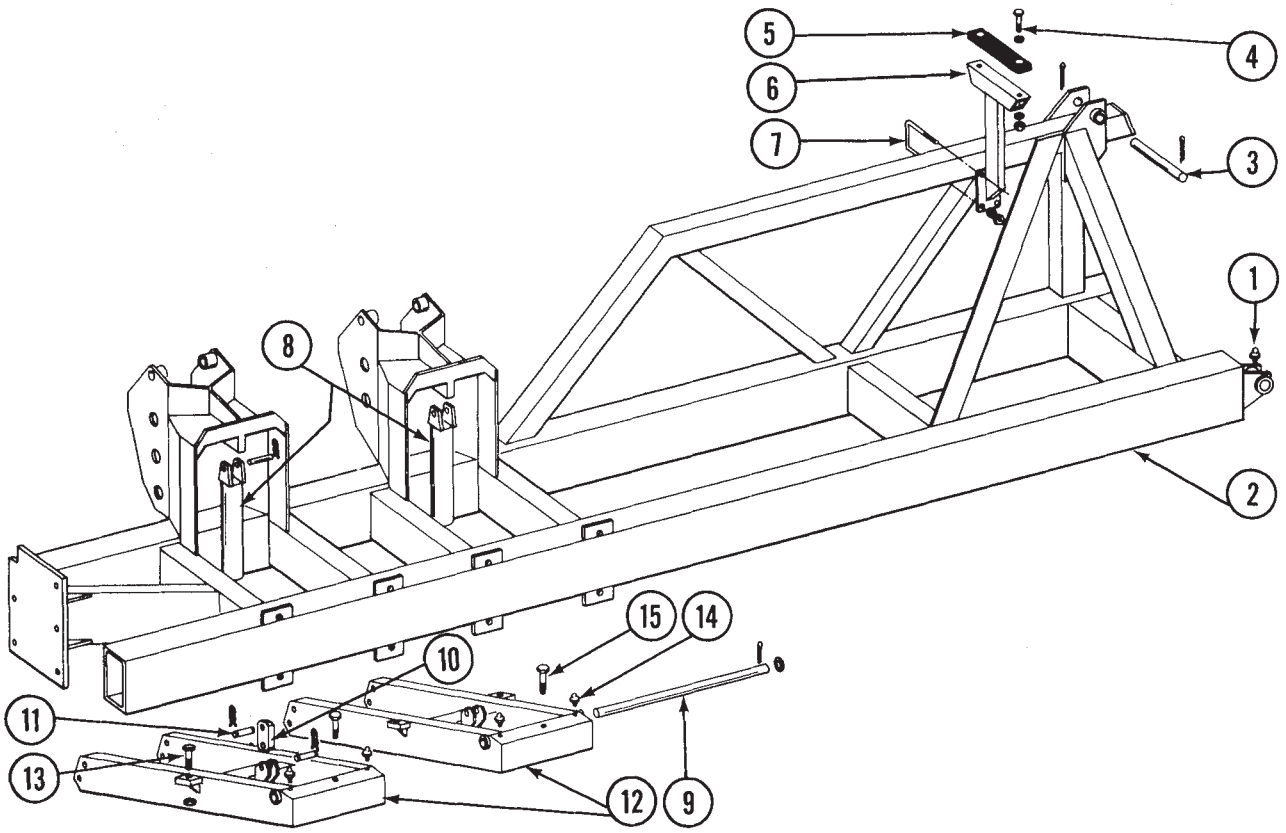
WING ASSEMBLY WITH LIFT ARM

12 Row 30 and 12 Row Wide



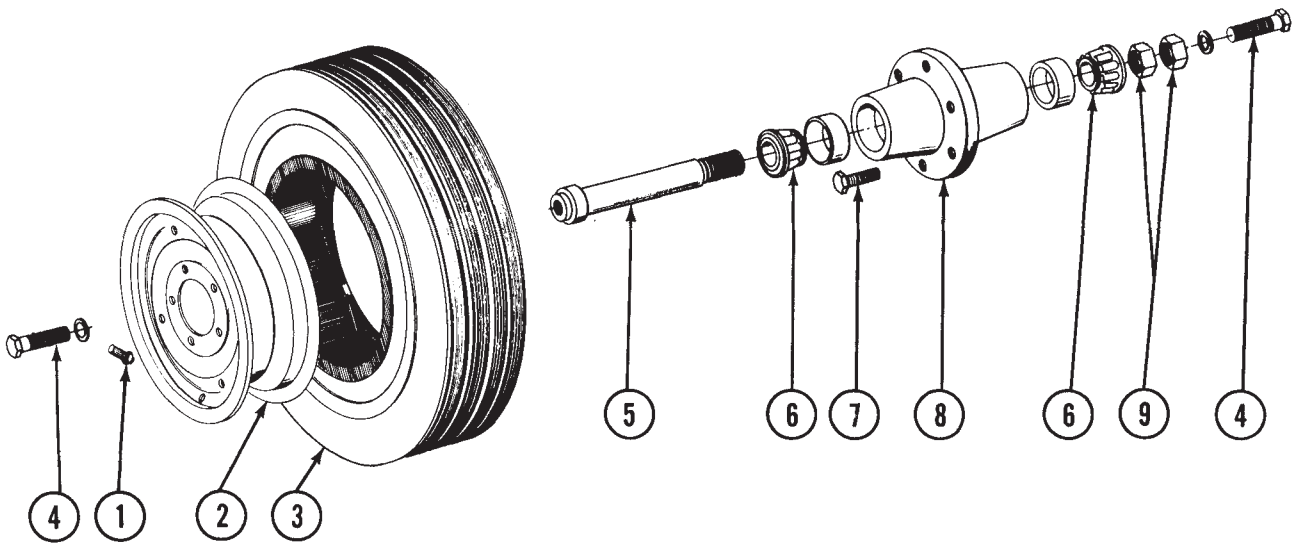
ITEM	PART NO.	DESCRIPTION
1.	10643	Grease Fitting, 1/4" - 28, 45°
2.	A3404	Wing, R.H., 12 Row 30
	A3403	Wing, L.H., 12 Row 30
	A3726	Wing, R.H., 12 Row 36
	A3727	Wing, L.H., 12 Row 36
	A3732	Wing, R.H., 12 Row 38
	A3731	Wing, L.H., 12 Row 38
3.	D1707	Pin, 1 1/4" x 6 1/2"
	10460	Cotter Pin, 1/4" x 2"
4.	10039	HHCS, 1/2" - 13 x 1 3/4"
	10206	Washer, 1/2" SAE
	10111	Lock Nut, 1/2" - 13
5.	D4512	Stop, Rubber
6.	A3532	Stand, Marker Support
7.	D4743	U-Bolt, 3" x 3" x 1/2" - 13
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
8.		Cylinder, See Wing Lift Cylinder Page
9.	D4499	Shaft, 1 1/4" x 21 1/2"
	10226	Washer, 1 1/4" SAE
	10460	Cotter Pin, 1/4" x 2"
10.	D4498	Bar
11.	R0375	Pin
	R0193	Clip
12.	A3535	Arm, Lift
13.	10290	Hex Head Adjusting Bolt, 3/4" - 10 x 3"
	10105	Hex Nut, 3/4" - 10
14.	10641	Grease Fitting, 1/8" NPT
15.	10039	HHCS, 1/2" - 13 x 1 3/4"
	10206	Washer, 1/2" SAE
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13

WING ASSEMBLY WITH LIFT ARMS, 16 Row 30



ITEM	PART NO.	DESCRIPTION
1.	10643	Grease Fitting, 1/4" - 28, 45°
2.	A3510	Wing, R.H.
	A3509	Wing, L.H.
3.	D1707	Pin, 1 1/4" x 6 1/2"
	10460	Cotter Pin, 1/4" x 2"
4.	10039	HHCS, 1/2" - 13 x 1 3/4"
	10206	Washer, 1/2" SAE
	10111	Lock Nut, 1/2" - 13
5.	D4512	Stop, Rubber
6.	A3532	Stand, Marker Support
7.	D4743	U-Bolt, 3" x 3" x 1/2" - 13
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
8.		Cylinder, See Wing Lift Cylinder Page
9.	D4499	Shaft, 1 1/4" x 21 1/2"
	10226	Washer, 1 1/4" SAE
	10460	Cotter Pin, 1/4" x 2"
10.	D4498	Bar
11.	R0375	Pin
	R0193	Clip
12.	A3535	Arm, Lift
13.	10290	Hex Head Adjusting Bolt, 3/4" - 10 x 3"
	10105	Hex Nut, 3/4" - 10
14.	10641	Grease Fitting, 1/8" NPT
15.	10039	HHCS, 1/2" - 13 x 1 3/4"
	10206	Washer, 1/2" SAE
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13

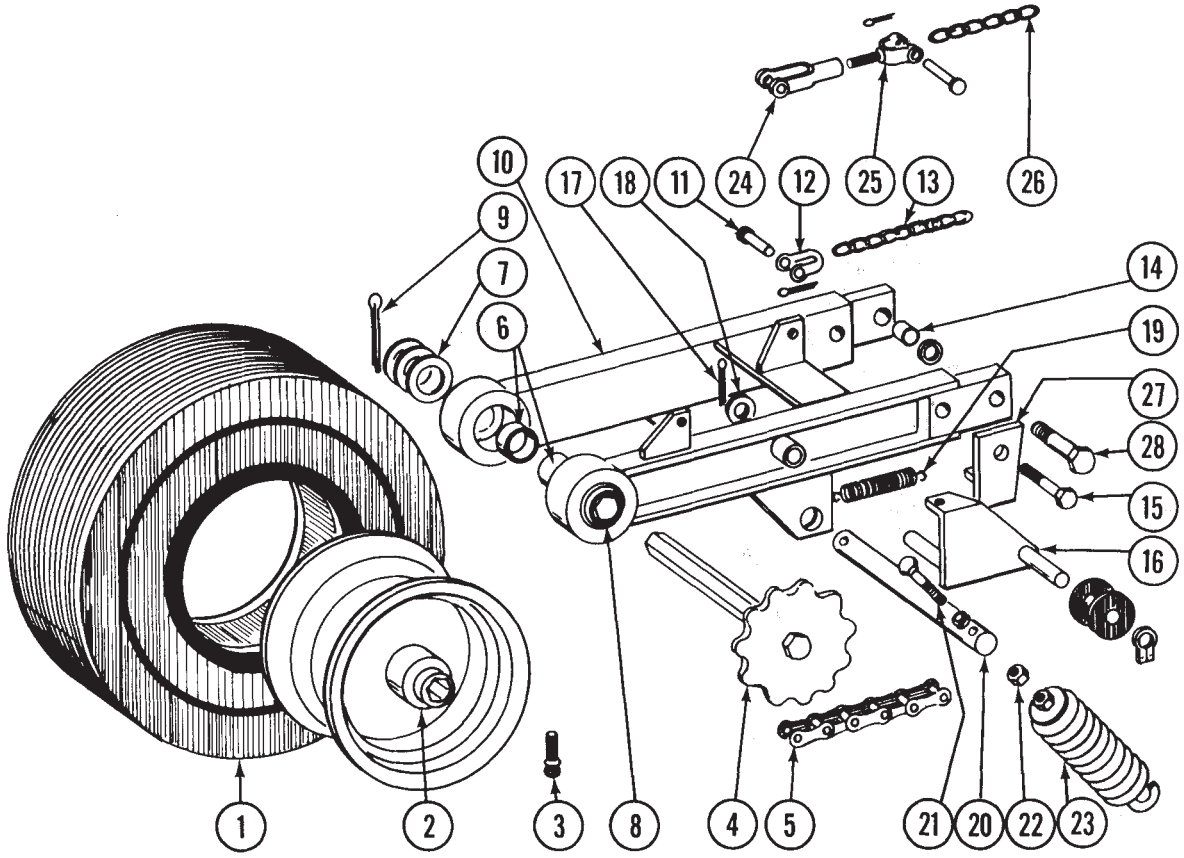
LIFT WHEEL ASSEMBLY



ITEM	PART NO.	DESCRIPTION
1.	D1166	Valve Stem
2.	A2908	Rim, 20 x 5.50 F
3.	D2648	Tire, 7.50 x 20", 6 Ply Tubeless
4.	10329	HHCS, 7/8" - 9 x 3 1/2"
	10330	Lock Washer, 7/8"
5.	A3521	Spindle
6.	A0895	Bearing
7.	R0270	Lug Bolt, 9/16" - 18
8.	A2148	Hub w/cups, 6 Bolt
	R0434	Cup
9.	10087	Jam Nut, 1 1/2" - 12

CONTACT DRIVE WHEEL AND ARM ASSEMBLY

L.H. Side Of Planter Shown

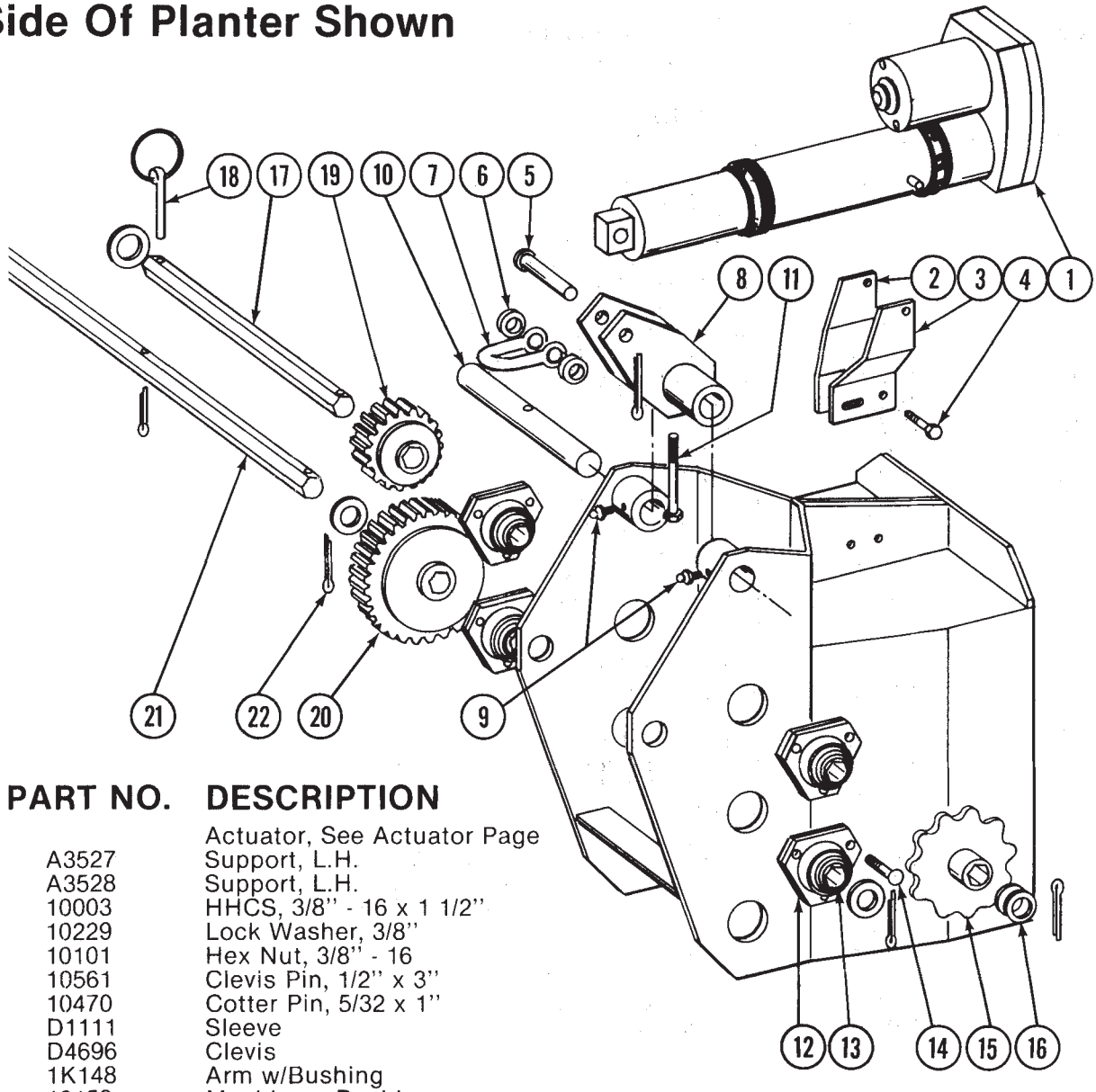


CONTACT DRIVE WHEEL AND ARM ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1.	D4700	Tire, 4.8 x 8, 6 Ply
2.	A3553	Rim, 3.75 x 8
3.	D4701	Valve Stem
4.	A3554	Sprocket w/Shaft, 12 Tooth
5.	3200-46	Chain, No. 2050, 46 Pitch Including Connector Link
	R0195	Connector Link, No. 2050
6.	D3660-08	Sleeve, Hex
7.	10233	Machinery Bushing, 1"
8.	2100-03	Bearing, 7/8 Hex Bore
9.	10460	Cotter Pin, 1/4" x 2" R.H.
	10463	Cotter Pin, 1/4" x 1 1/2" L.H.
10.	A3570	Wheel Arm, R.H.
	A3551	Wheel Arm, L.H., (Shown)
11.	10166	Clevis Pin, 3/8" x 1 1/2"
	10099	Cotter Pin, 3/32" x 3/4"
12.	D2551	Clevis
13.	3309-01	Chain
14.	B0123	Bushing
15.	10053	HHCS, 1/2" - 13 x 2 1/2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
16.	A3558	Idler w/Spool and Ring, R.H.
	A3559	Idler w/Spool and Ring, L.H.
	10435	Ring
	D0916	Spool
17.	10453	Cotter Pin, 3/16" x 1"
18.	10205	Washer, 5/8" SAE
19.	D3791	Spring
20.	D4805	Pin, 1" x 9 1/4"
21.	10051	Hex Head Adjusting Bolt, 1/2" - 13 x 3"
	10206	Washer, 1/2" SAE
22.	10501	Jam Nut, 1/2"
23.	A2068	Spring
24.	D4882	Adjusting Yoke End, 16 Row 30 Only (Outer Drive Wheel)
25.	D4883	Plain Yoke End, 16 Row 30 Only (Outer Drive Wheel)
26.	3309-02	Chain, 16 Row 30 Only (Outer Drive Wheel)
27.	A3563	Stop, L.H. (Shown)
	A3564	Stop, R.H.
28.	10008	HHCS, 5/8" - 11 x 2"
	10205	Washer, 5/8" SAE
	10107	Lock Nut, 5/8" - 11

DRIVE LINE, 12 Row 30 and 12 Row Wide

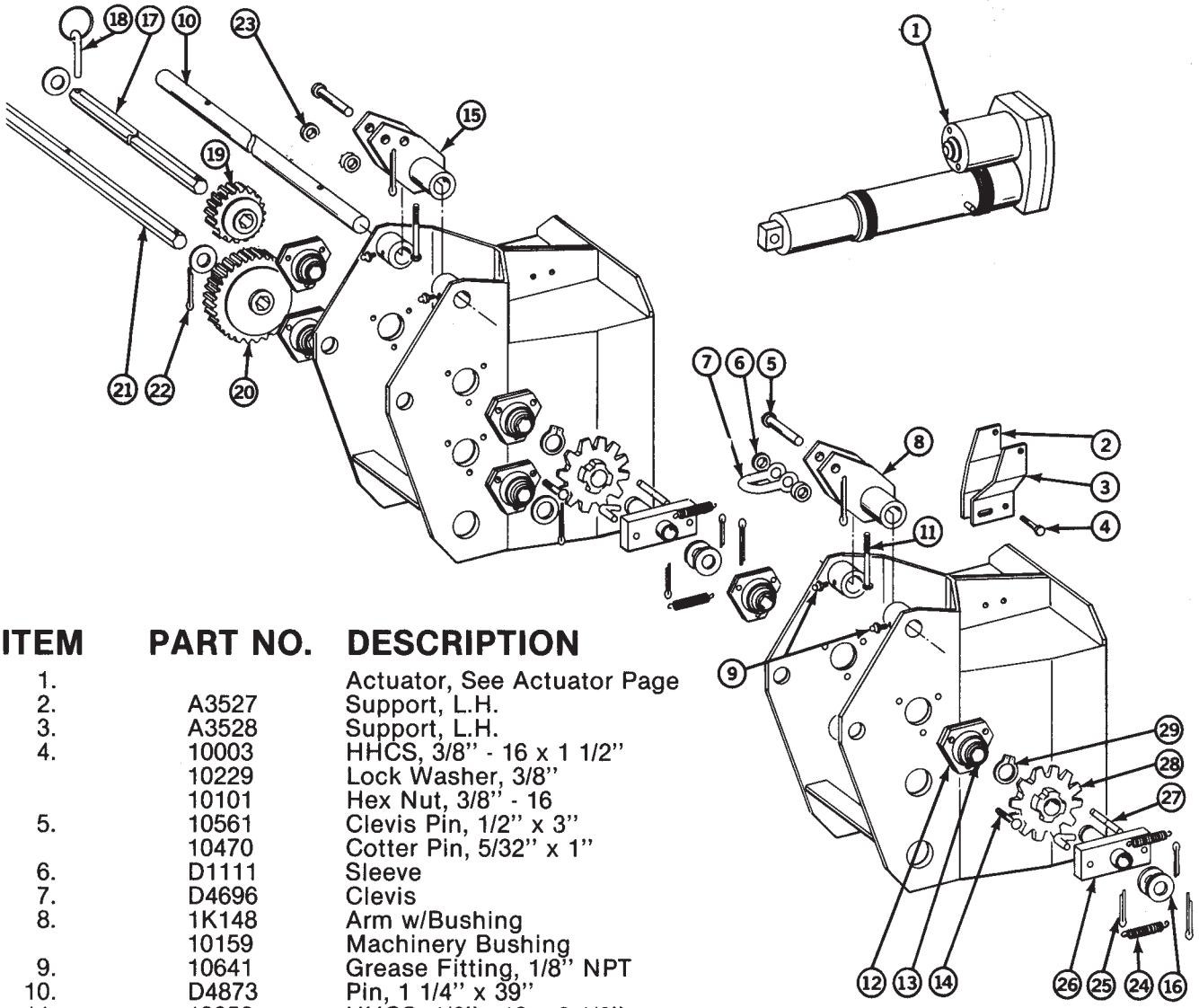
L.H. Side Of Planter Shown



ITEM	PART NO.	DESCRIPTION
1.		Actuator, See Actuator Page
2.	A3527	Support, L.H.
3.	A3528	Support, L.H.
4.	10003	HHCS, 3/8" - 16 x 1 1/2"
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
5.	10561	Clevis Pin, 1/2" x 3"
	10470	Cotter Pin, 5/32 x 1"
6.	D1111	Sleeve
7.	D4696	Clevis
8.	1K148	Arm w/Bushing
	10159	Machinery Bushing
9.	10641	Grease Fitting, 1/8" NPT
10.	D4672	Pin, 1 1/4" x 9"
11.	10053	HHCS, 1/2" - 13 x 2 1/2"
	10111	Lock Nut, 1/2" - 13
12.	3400-01	Flangette
13.	2100-03	Bearing, 7/8 Hex Bore
14.	10303	Carriage Bolt, 5/16" - 18 x 1"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
15.	2500-18	Sprocket, 12 Tooth
16.	10233	Machinery Bushing, 1"
17.	D2707	Shaft, 7/8" x 15 1/2"
18.	D2558	Lynch Pin, 1/4"
19.	A3526	Gear, 18 Tooth
20.	A3525	Gear, 32 Tooth
21.	D4756	Drive Shaft, 7/8" x 27 3/4"
22.	10463	Cotter Pin, 1/4" x 1 1/2"
19.	A4054	Gear, 18 Tooth
20.	A4053	Gear, 32 Tooth
21.	D4756	Drive Shaft, 7/8" x 27 3/4", 12 Row 30
	D5469	Drive Shaft, 7/8" x 31 1/2", 12 Row 36
	D5453	Drive Shaft, 7/8" x 32 1/4" 12 Row 38
22.	10463	Cotter Pin, 1/4" x 1 1/2"

DRIVE LINE, 16 Row 30

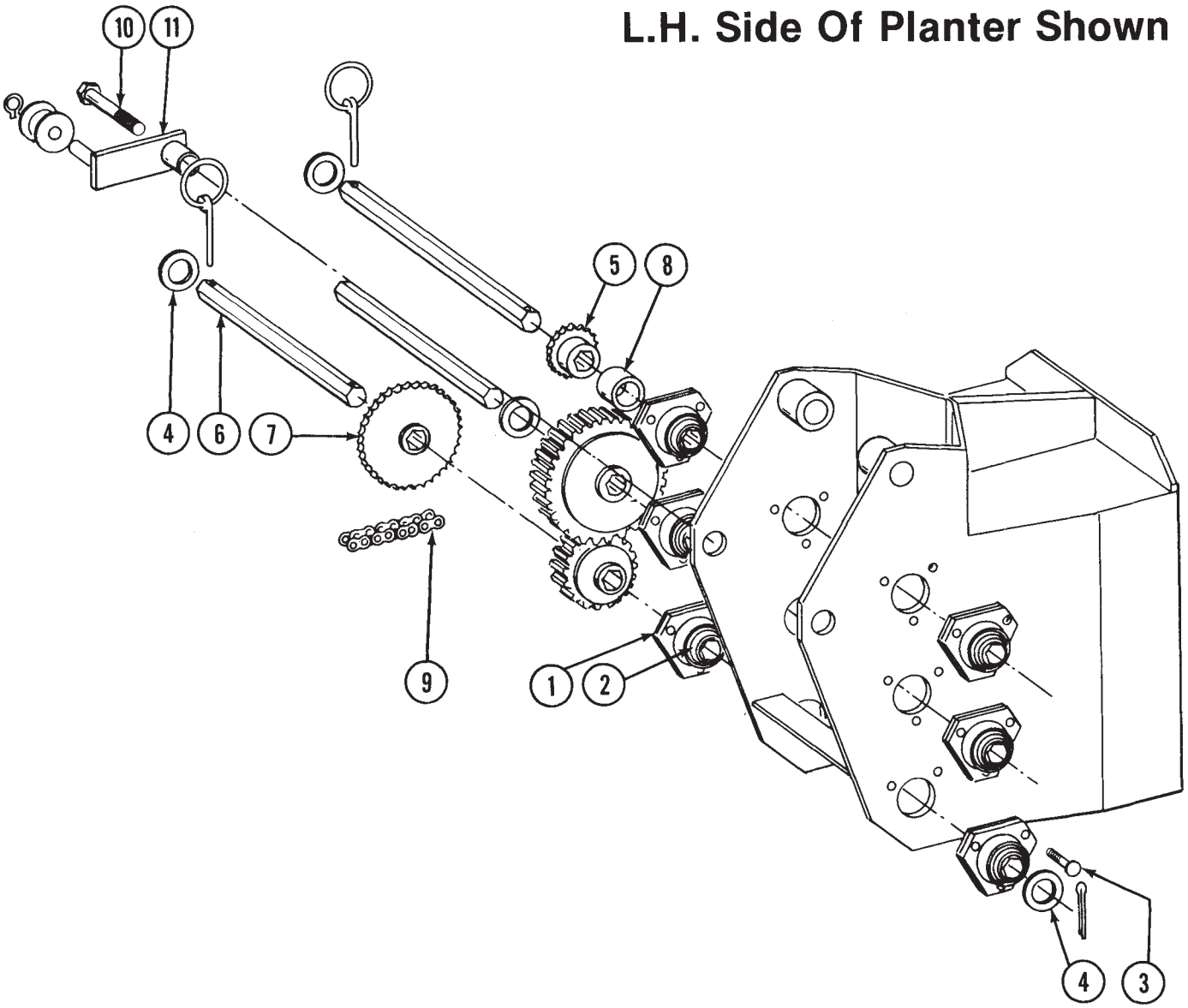
L.H. Side of Planter Shown



ITEM	PART NO.	DESCRIPTION
1.		Actuator, See Actuator Page
2.	A3527	Support, L.H.
3.	A3528	Support, L.H.
4.	10003	HHCS, 3/8" - 16 x 1 1/2"
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
5.	10561	Clevis Pin, 1/2" x 3"
	10470	Cotter Pin, 5/32" x 1"
6.	D1111	Sleeve
7.	D4696	Clevis
8.	1K148	Arm w/Bushing
	10159	Machinery Bushing
9.	10641	Grease Fitting, 1/8" NPT
10.	D4873	Pin, 1 1/4" x 39"
11.	10053	HHCS, 1/2" - 13 x 2 1/2"
	10111	Lock Nut, 1/2" x 13
12.	3400-01	Flangette
13.	2100-03	Bearing, 7/8 Hex Bore
14.	10303	Carriage Bolt, 5/16" - 18 x 1"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
15.	A3710	Arm, Outer Drive Wheel
16.	10233	Machinery Bushing, 1"
17.	D4712	Shaft, 7/8" x 47"
18.	D2558	Lynch Pin, 1/4"
19.	A4054	Gear, 18 Tooth
20.	A4053	Gear, 32 Tooth
21.	D4756	Drive Shaft, 7/8" x 27 3/4"
22.	10463	Cotter Pin, 1/4" x 1 1/2"
23.	D4887-01	Sleeve
24.	D1256	Spring
25.	10464	Cotter Pin, 3/16" x 1"
26.	A0378	Block and Hub Assembly
27.	D1255	"L" Pin
28.	A0376	Hub/Sprocket Assembly
29.	10430	Ring
A.	A0261L	Ratchet and Sprocket Assembly, L.H.
	A0261R	Ratchet and Sprocket Assembly, R.H.
		(Includes Items 24 thru 29)

EXTENDED DRILL SPROCKET PACKAGE

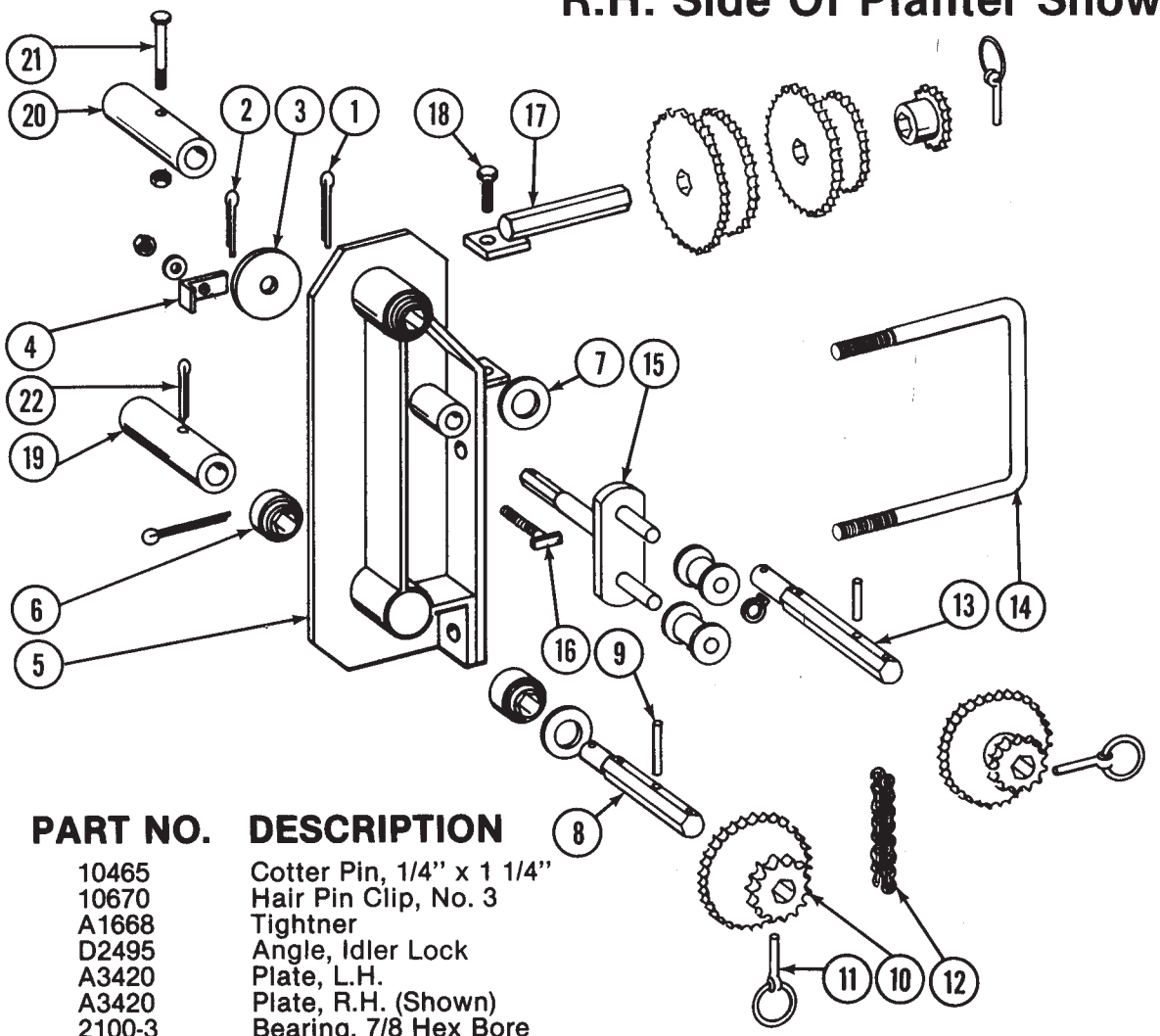
L.H. Side Of Planter Shown



ITEM	PART NO.	DESCRIPTION
1.	3400-01	Flangette
2.	2100-03	Bearing, 7/8 Hex Bore
3.	10303	Carriage Bolt, 5/16" - 18 x 1"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
4.	10233	Machinery Bushing, 1"
5.	2500-16	Sprocket, 16 Tooth
6.	D4773	Shaft, 7/8" x 14 1/2"
	D2558	Lynch Pin, 1/4"
	10463	Cotter Pin, 1/4" x 1 1/2"
7.	2500-21	Sprocket, 32 Tooth
8.	D1199-06	Spacer
9.	3300-32	Chain, No. 2040, 32 Pitch Including Connector Link
	R0194	Connector Link, No. 2040
10.	10036	HHCS, 5/8" - 11 x 4"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
11.	A3629	Idler w/Spool and Ring
	10435	Ring
	D1067	Spool
A.	6654X	Extended Drill Sprocket Package, Includes: (4) 2100-03, (2) 2500-16, (2) 2500-21, (2) 3300-32, (8) 3400-01, (2) A3629, (2) 10036, (2) 10104, (12) 10106, (2) 10230, (12) 10232, (6) 10233, (12) 10303, (2) 10463, (4)D2558, (2) D1199-06, (2)D4773

TRANSMISSION ASSEMBLY

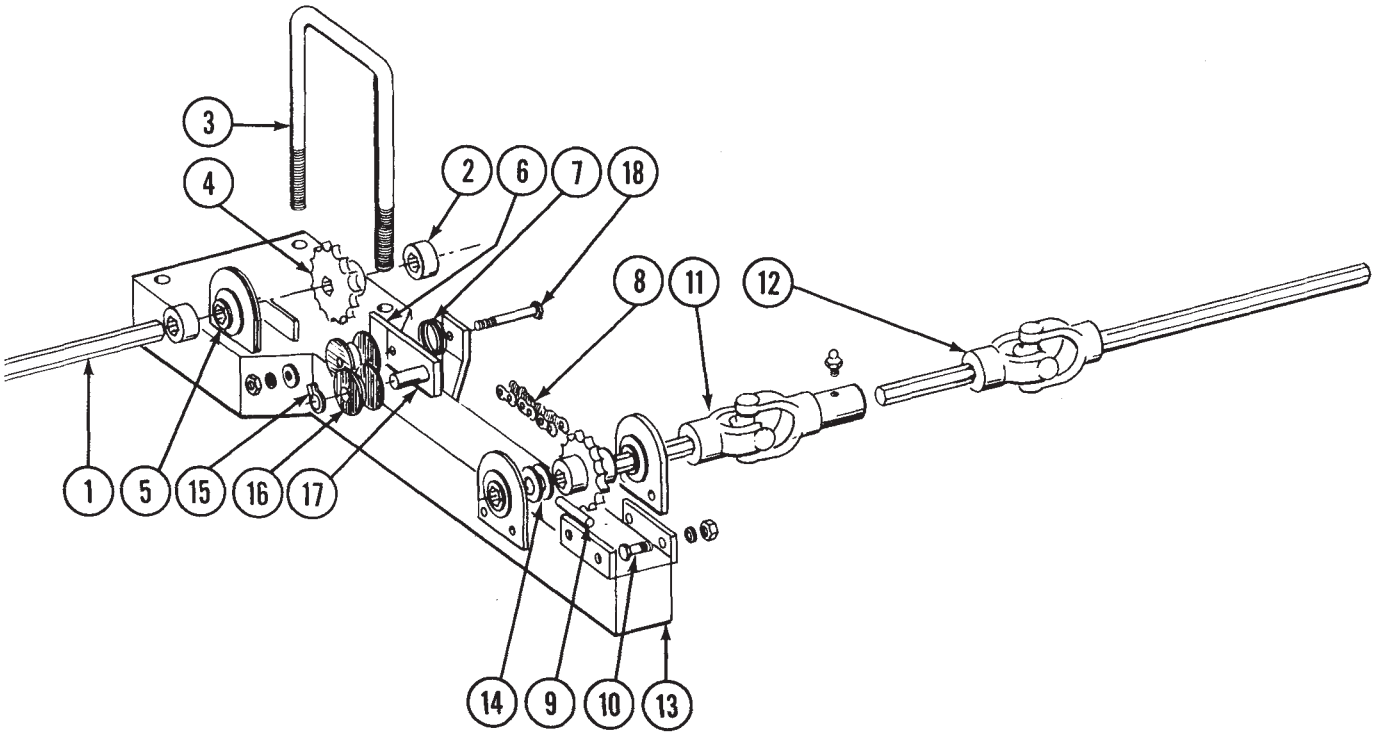
R.H. Side Of Planter Shown



ITEM	PART NO.	DESCRIPTION
1.	10465	Cotter Pin, 1/4" x 1 1/4"
2.	10670	Hair Pin Clip, No. 3
3.	A1668	Tightner
4.	D2495	Angle, Idler Lock
5.	A3420	Plate, L.H.
	A3420	Plate, R.H. (Shown)
6.	2100-3	Bearing, 7/8 Hex Bore
7.	10233	Machinery Bushing, 1"
8.	D5215	Shaft, Bottom, 7/8" x 6 3/8"
9.	10602	Spring Pin, 1/4" x 1 1/2"
10.	2500-25	Sprocket, 14 Tooth
	2500-26	Sprocket, 18-28
	2500-27	Sprocket, 16-30
	2500-28	Sprocket, 22-26
11.	D2558	Pin, Lynch, 1/4"
12.	3300-40	Chain, No. 2040, 40 Pitch Including Connector Link
	R0194	Connector Link, No. 2040
13.	D4748	Shaft, Top, 7/8" x 6 3/8"
14.	D1113	U-Bolt, 5" x 7" x 5/8" - 11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
15.	A0503	Idler w/Spools and Rings
	D1067	Spool
	10435	Ring
16.	A3428	T-Bolt
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
17.	A1786	Rod, Sprocket Storage
18.	10019	HHCS, 5/16" - 18 x 1"
	10109	Lock Nut, 5/16" - 18
19.	D5212	Coupler, Bottom, 1 3/4"
20.	D4749	Coupler, Top, 1 3/4"
21.	10339	HHCS, 5/16" - 18 x 2, Grade 2
	10109	Lock Nut, 5/16" - 18
22.	10460	Cotter Pin, 1/4" x 2"

DRILL SHAFT DRIVE LINE, WING SECTION

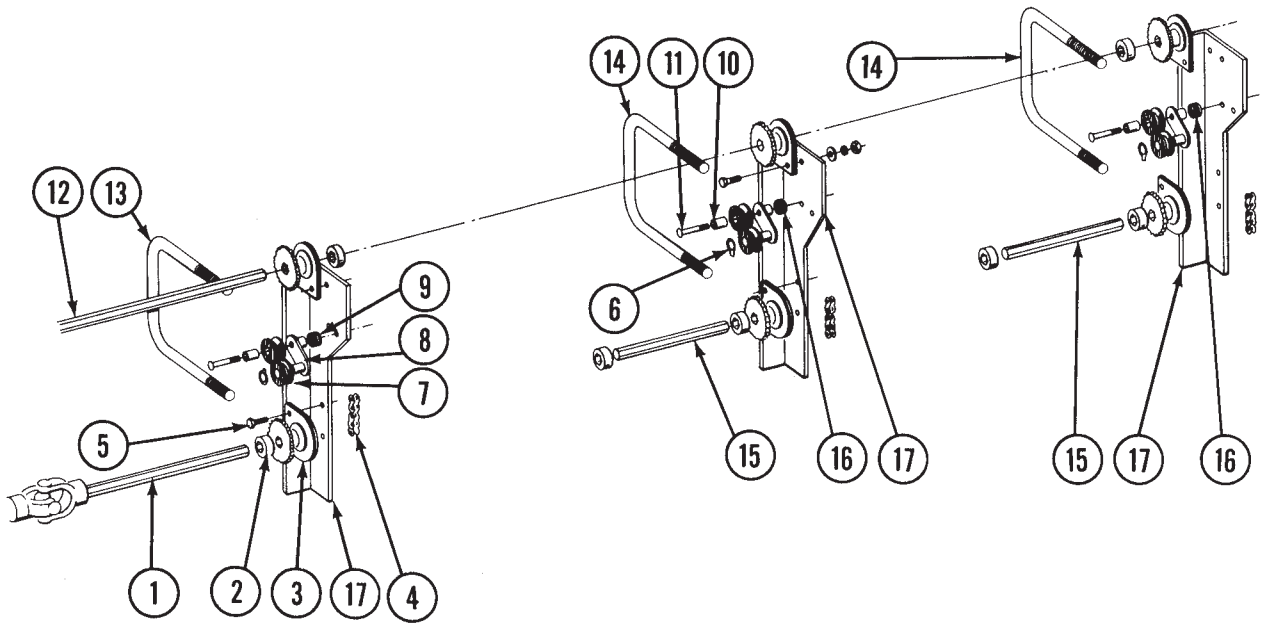
12 Row 30 thru 16 Row 30



ITEM	PART NO.	DESCRIPTION
1.	D0914-79	Shaft, 7/8" Hex, 12 Row 30
	D0914-95	Shaft, 7/8" Hex, 12 Row 36
	D0914-105	Shaft, 7/8" Hex, 12 Row 38
	D0914-138	Shaft, 7/8" Hex, 16 Row 30
2.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16"-18 x 1/2"
3.	D1134	U-Bolt, 7" x 5" x 5/8"-11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8"-11
4.	2500-19	Sprocket, 19 Tooth
5.	A2180	Hanger Bearing
6.	D1026	Bushing
7.	D1065	Spring, L.H. Side Of Planter
	D2134	Spring, R.H. Side Of Planter
8.	3303-131	Chain, No. 41, 131 Pitch Including Connector Link and Offset Link
	R0196	Connector Link, No. 41
	R0201	Offset Link, No. 41
9.	10602	Roll Pin, 1/4" x 1 1/2"
10.	10001	HHCS, 3/8"-16 x 1"
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8"-16
11.	A3421	Universal Joint w/Shaft and Grease Fittings
	10343	Grease Fitting, 1/8"-27, 90°
	10643	Grease Fitting, 1/4"-28
12.		Universal Joint w/Shaft and Grease Fitting, See Drill Shaft Drive Line Center Section Page
13.	A3401	Bracket, (Shown)
	A3402	Bracket
14.	10233	Machinery Bushing, 1"
15.	10435	Ring
16.	D1068	Spool
17.	A2056	Idler, Less Spools and Rings
18.	10061	HHCS, 3/8"-16 x 3 1/2"
	10210	Washer, 3/8" USS
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16

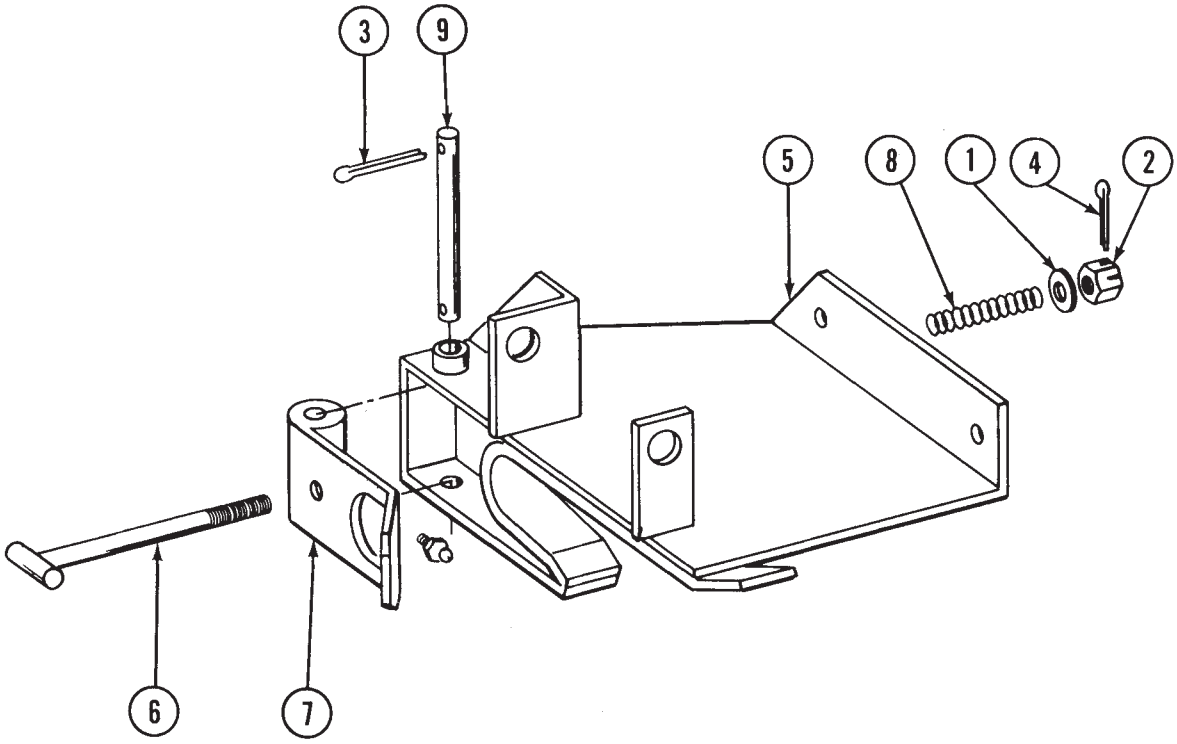
DRILL SHAFT DRIVE LINE, CENTER SECTION

12 Row 30 thru 16 Row 30



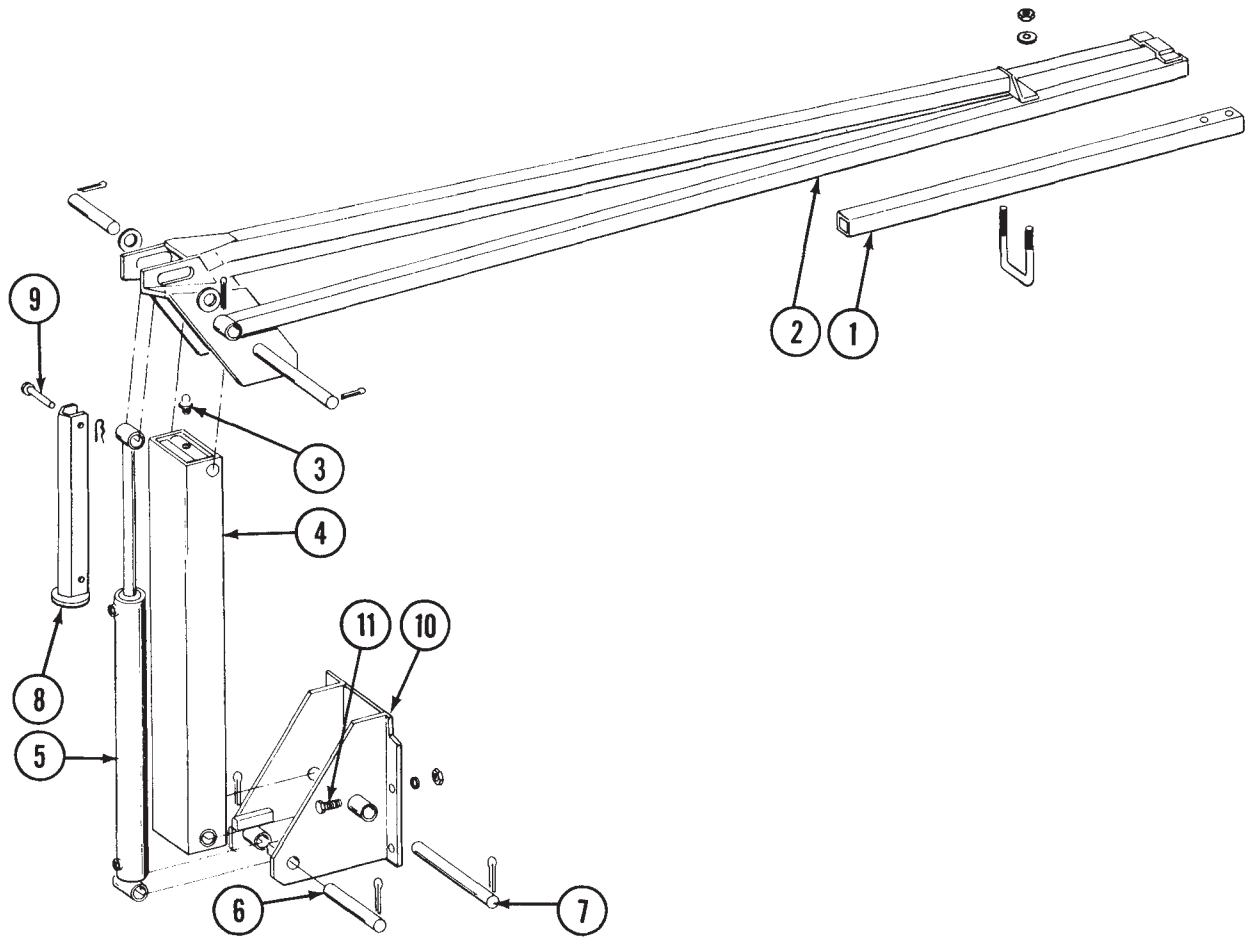
ITEM	PART NO.	DESCRIPTION
1.	A3422	Universal Joint w/Shaft and Grease Fitting, 12 Row 30, 12 Row 38 and 16 Row 30
	A3652	Universal Joint w/Shaft and Grease Fitting, 12 Row 36
	10343	Grease Fitting, 1/8" - 27, 90°
2.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16" - 18 x 1/2"
3.	A1720	Bearing and Sprocket, 7/8" Hex
4.	3303-67	Chain, No. 41, 67 Pitch Including Connector Link and Offset Link
	R0196	Connector Link, No. 41
	R0201	Offset Link, No. 41
5.	10001	HHCS, 3/8" - 16 x 1"
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
6.	10435	Ring
7.	D1068	Spool
8.	A2056	Idler, Less Spools and Rings
9.	D1065	Spring
10.	D1026	Bushing
11.	10061	HHCS, 3/8" - 16 x 3 1/2"
	10210	Washer, 3/8" USS
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
12.	D0914-63	Shaft, 12 Row 30 and 16 Row 30 and L.H.
	D0914-79	Shaft, 12 Row 36 and 12 Row 38, R.H. and L.H.
13.	D1114	U-Bolt, 7" x 7" x 5/8"-11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
14.	D3887	U-Bolt, 5" x 7" x 5/8" - 11, Special
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
15.	D0914-12.25	Shaft, 7/8" Hex
16.	D2134	Spring
17.	A2766	Bracket

TRANSPORT LATCH ASSEMBLY



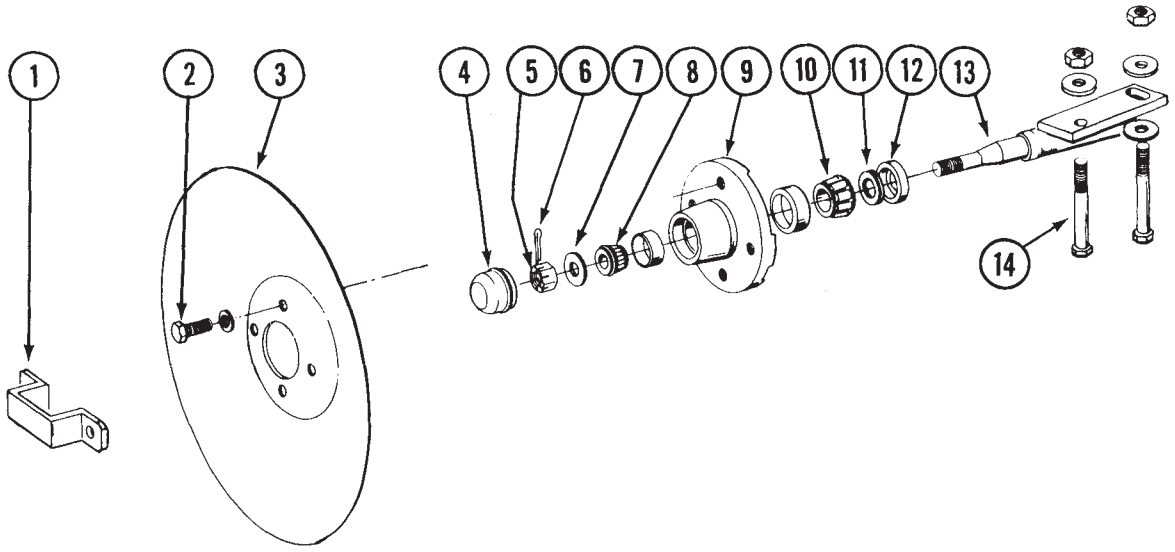
ITEM	PART NO.	DESCRIPTION
1.	10216	Washer, 1/2" USS
2.	10335	Hex Jam Nut, 1/2" - 13
3.	10463	Cotter Pin, 1/4" x 1 1/2"
4.	10470	Cotter Pin, 5/32" x 1"
5.	A3572	Latch
6.	A3574	"T" Bolt
7.	A3575	Lock Plate w/Grease Fitting
	10641	Grease Fitting, 1/8" NPT
8.	D4721	Spring
9.	D4732	Pin, 7/8" x 6 1/4"

LOW PROFILE - DOUBLE FOLD MARKER ASSEMBLY



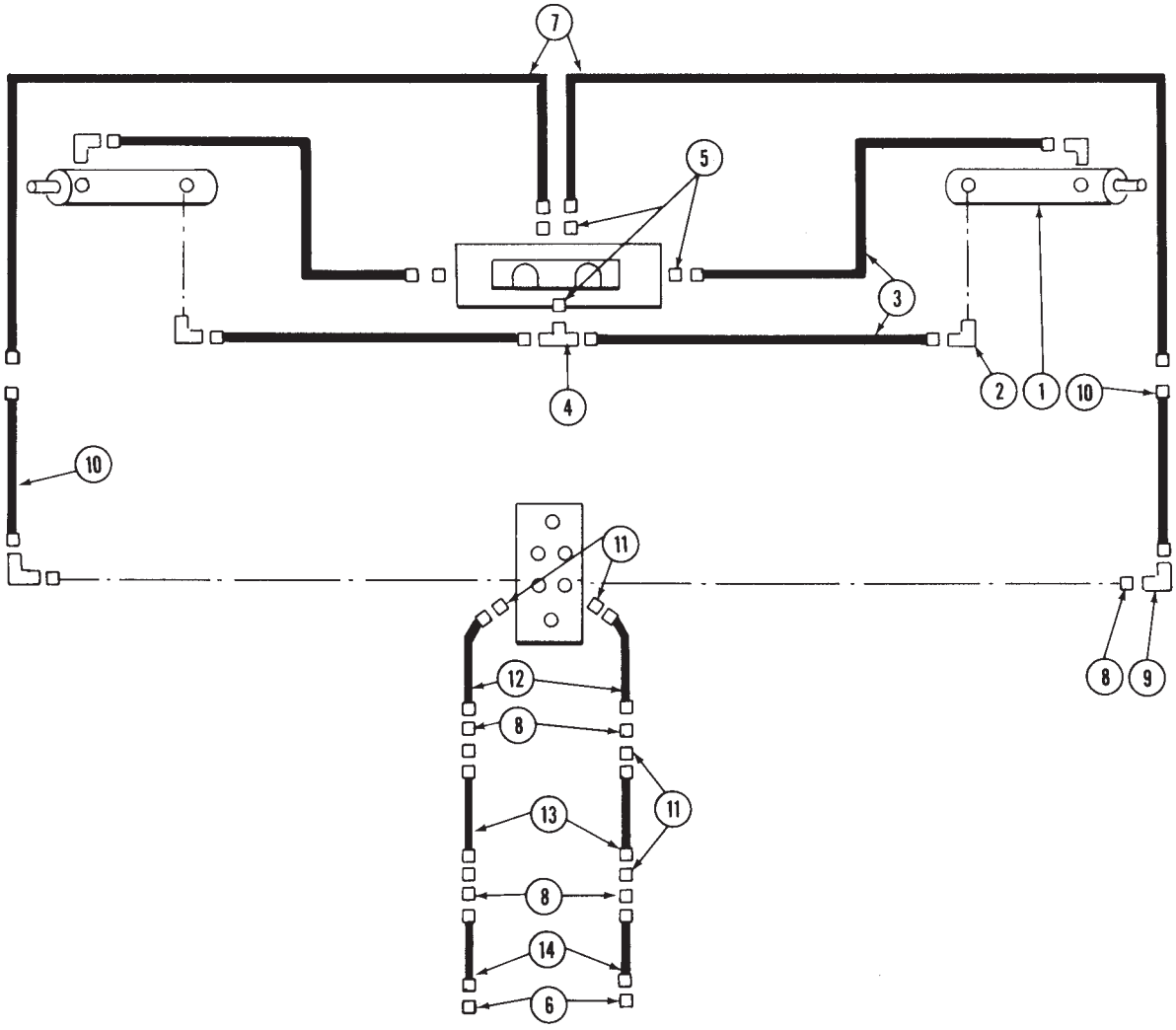
ITEM	PART NO.	DESCRIPTION
1.	D0453-05	Extension, 55", 12 Row 30, 12 Row 36, 16 Row 30
	D0453-04	Extension, 60", 12 Row 38
2.	A3542	Arm, Second Stage, W/Pins and U-Bolt, 12 Row 30, 106"
	A3762	Arm, Second Stage, W/Pins and U-Bolt, 12 Row 36, 138 1/2"
	A3760	Arm, Second Stage, W/Pins and U-Bolt, 12 Row 38, 150 1/2"
	A3545	Arm, Second Stage, W/Pins and U-Bolt, 16 Row 30, 166"
	D2721	U-Bolt, 2" x 2" x 1/2"-13
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2"
	D0737	Pin, 1 1/4" x 13 1/4"
	D0826	Pin, 1 1/4" x 5 1/2"
	10460	Cotter Pin, 1/4" x 2"
	10226	Washer, 1 1/4" SAE
3.	10641	Grease Fitting, 1/8" NPT
4.	A0151	Arm, First Stage
5.		Cylinder, See Marker Cylinder Page
6.	D0652	Pin, 1 1/4" x 9 1/2", L.H. Side
	D4724	Pin, 1 1/4" x 10", R.H. Side
	10460	Cotter Pin, 1/4" x 2"
7.	D0737	Pin, 1 1/4" x 13 1/4"
	10460	Cotter Pin, 1/4" x 2"
8.	A2913	Lockup
9.	10561	Clevis Pin, 1/2" x 3"
	10670	Hair Pin Clip, No. 3
10.	A3593	Mount, L.H. (Shown)
	A3594	Mount, R.H.
11.	10008	HHCS, 5/8" - 11 x 2"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11

MARKER HUB ASSEMBLY



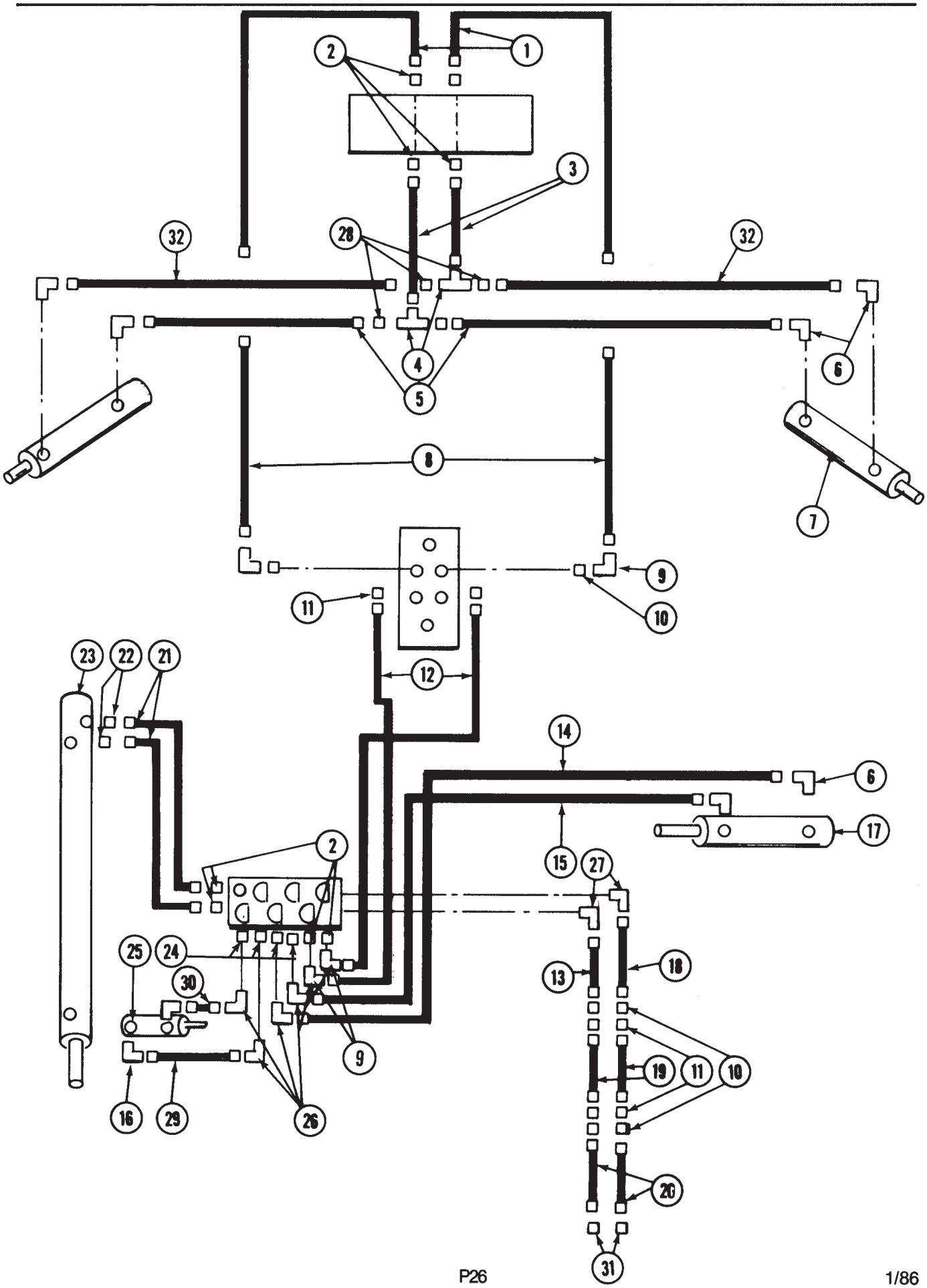
ITEM	PART NO.	DESCRIPTION
1.	D2597	Retainer
2.	10722	HHCS, 1/2" - 20 x 1"
	10228	Lock Washer, 1/2"
3.	D746	Blade, 16"
4.	D840	Cap
5.	10725	Hex Nut, Slotted, 5/8" - 18
6.	10470	Cotter Pin, 5/32" x 1"
7.	10724	Washer, 5/8"
8.	A257	Bearing, Outer
9.	A167	Hub w/Cups
	R151	Cup, Outer
	R150	Cup, Inner
10.	A245	Bearing, Inner
11.	A899	Seal, Rubber
12.	A243	Seal, Grease
13.	A1677	Spindle, L.H., Less Hardware (Shown)
	A1676	Spindle, R.H. Less Hardware
14.	10033	HHCS, 1/2" - 13 x 3 1/2"
	10168	Machinery Bushing, 1/2", 7 Ga.
	10102	Hex Nut, 1/2" - 13
A.	A1679	Hub and Spindle Assembly L.H. (Items 2 and 4-13)
	A1678	Hub and Spindle Assembly R.H. (Items 2 and 4-13)

HYDRAULIC SYSTEM, MARKER, 12 Row 30 and Wide



ITEM	PART NO.	DESCRIPTION
1.		Cylinder, See Marker Cylinder Page
2.	2500-08-08	Elbow
3.	A1033	Hose Assembly, 3/8" x 250", 12 Row 30
	A1097	Hose Assembly, 3/8" x 288", 12 Row 36
	A3108	Hose Assembly, 3/8" x 298", 12 Row 38
4.	6600-08	Tee, Swivel
5.	6400-08	Connector, Male O-Ring, 3/4-16
	6400-08-10	Connector, Male O-Ring, 3/4 - 16 x 7/8 - 14
6.	D4086	Tip, Pioneer Male
7.	A1076	Hose Assembly, 3/8" x 30"
8.	2700-08	Bulkhead Tube Union
9.	6500-08	Elbow, Swivel
10.	A1082	Hose Assembly, 3/8" x 19"
11.	306-08	Lock Nut, 3/4" - 16
12.	A3105	Hose Assembly, 3/8" x 170"
13.	A1087	Hose Assembly, 3/8" x 74", 12 Row 30
	A1092	Hose Assembly, 3/8" x 104", 12 Row 36 and 38
14.	A1015	Hose Assembly, 3/8" x 138"

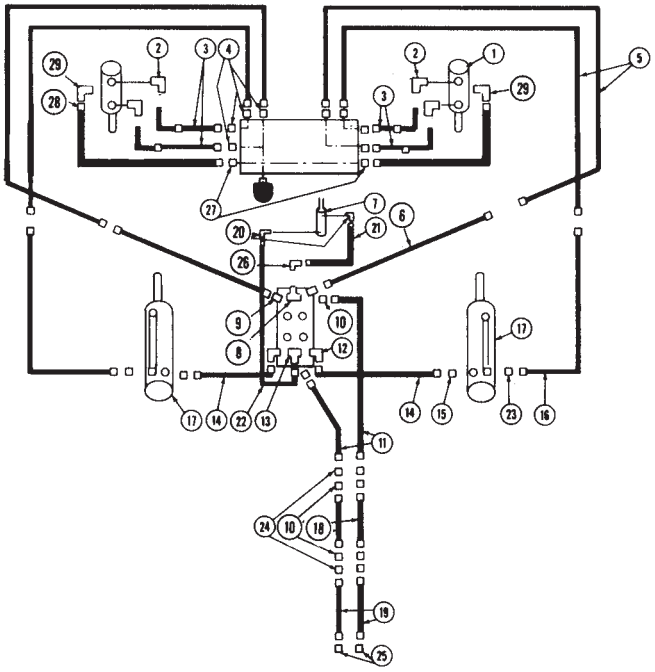
HYDRAULIC SYSTEM, ROTATE TO TRANSPORT, 12 Row 30 and Wide



HYDRAULIC SYSTEM, ROTATE TO TRANSPORT, 12 Row 30 and Wide

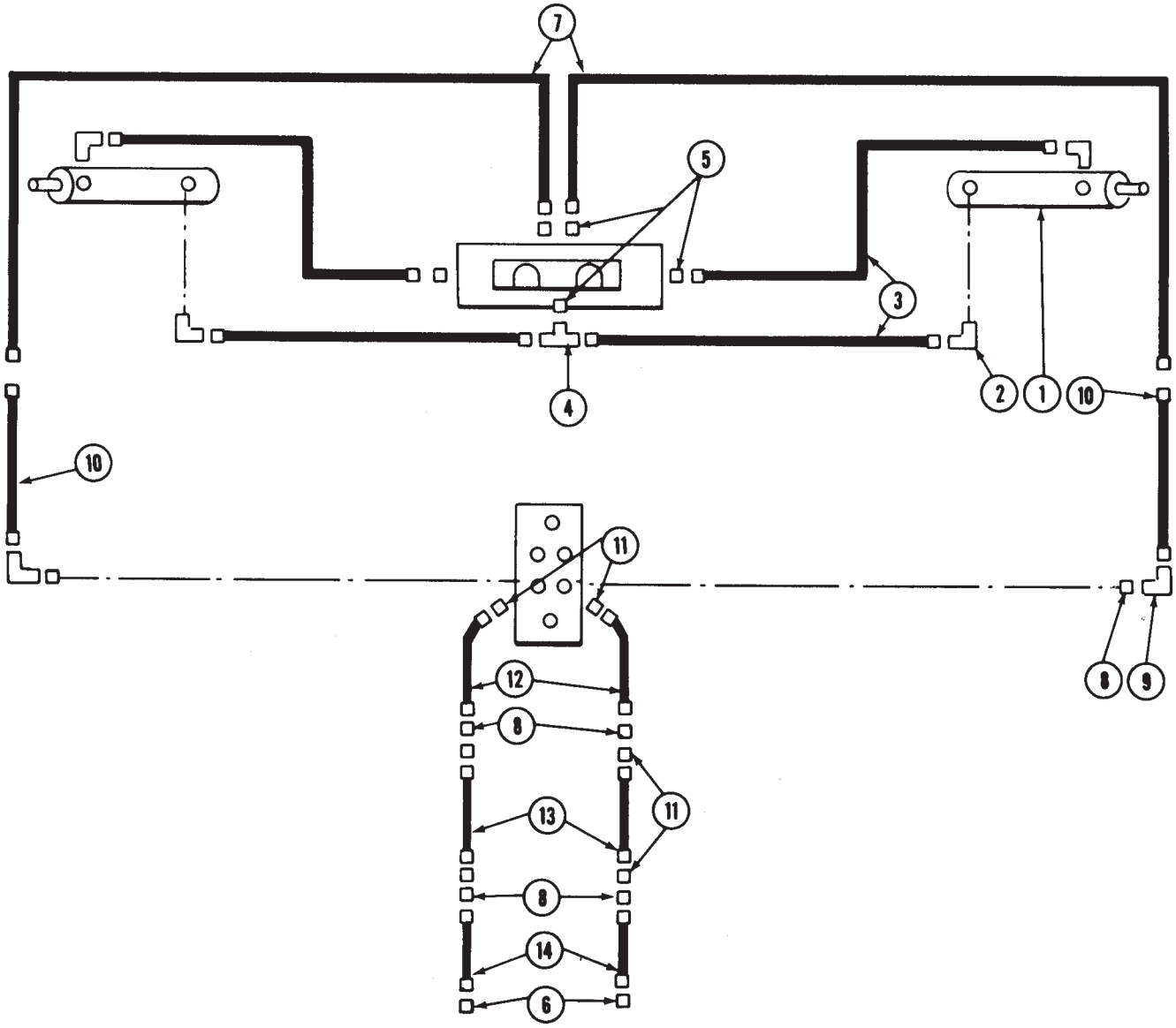
ITEM	PART NO.	DESCRIPTION
1.	A1085	Hose Assembly, 3/8" x 24 1/2"
2.	6400-08	Connector, Male O-Ring
3.	A1000	Hose Assembly, 3/8" x 15"
4.	2603-08	Tee, Tube
5.	A1132	Hose Assembly, 1/4" x 44"
6.	2501-06-08	Elbow
7.		Cylinder, See Wing Lock Cylinder Page
8.	A1083	Hose Assembly, 3/8" x 21"
9.	6500-08	Elbow, Swivel
10.	2700-08	Bulkhead Tube Union, 3/4" - 16
11.	306-08	Lock Nut, 3/4" - 16
12.	A1049	Hose Assembly, 3/8" x 160"
13.	A1003	Hose Assembly, 3/8" x 27"
14.	A1133	Hose Assembly, 1/4" x 138"
15.	A1134	Hose Assembly, 1/4" x 116"
16.	2501-06-04	Elbow
17.		Cylinder, See Rotation Cylinder Page
18.	A1076	Hose Assembly, 3/8" x 30"
19.	A1087	Hose Assembly, 3/8" x 74", 12 Row 30
	A1092	Hose Assembly, 3/8" x 104", 12 Row 36 and 38
20.	A1015	Hose Assembly, 3/8" x 138"
21.	A1044	Hose Assembly, 3/8" x 34"
22.	2404-08-08	Adapter, Straight, Male
23.		Cylinder, See Tongue Cylinder Page
24.	6400-06-08	Connector, Male, O-Ring
25.		Cylinder, See Tongue Lock Cylinder Page
26.	6500-06	Elbow, Swivel
27.	6801-08	Elbow, O-Ring
28.	2406-08-06	Tube Reducer
29.	A1138	Hose Assembly, 1/4" x 29"
30.	A1137	Hose Assembly, 1/4" x 23"
31.	D4086	Tip, Pioneer Male
32.	A1144	Hose Assembly, 1/4" x 54"

HYDRAULIC SYSTEM, PLANTER LIFT, 12 Row 30 and Wide



ITEM	PART NO.	DESCRIPTION
1.		Cylinder, See Wing Lift Cylinder Page
2.	2501-08-08	Elbow
3.	A3100	Hose Assembly, 3/8" x 196", 12 Row 30
	A3109	Hose Assembly, 3/8" x 222", 12 Row 36
	A1031	Hose Assembly, 3/8" x 234", 12 Row 38
4.	6400-08	Connector, Male, O-Ring
5.	A1085	Hose Assembly, 3/8" x 24 1/2"
6.	A1084	Hose Assembly, 3/8" x 23 1/4"
7.		Cylinder, See Lift Lock Cylinder Page
8.	A2645	Tee, Bulkhead
9.	2406-10-08	Tube, Reducer
10.	306-10	Lock Nut, 7/8" - 14
11.	A1416	Hose Assembly, 1/2" x 170"
12.	6500-10	Elbow, Swivel
13.	A2657	Tee, Bulkhead
14.	A1404	Hose Assembly, 1/2" x 41"
15.	2404-10-08	Adapter, Straight
16.	A1021	Hose Assembly, 3/8" x 56"
17.		Cylinder, See Center Section Lift Cylinder Page
18.	A1406	Hose Assembly, 1/2" x 74", 12 Row 30
	A1409	Hose Assembly, 1/2" x 104", 12 Row 36 and 38
19.	A1417	Hose Assembly, 1/2" x 138"
20.	2501-06-04	Elbow
21.	A1140	Hose Assembly, 1/4" x 52"
22.	A1139	Hose Assembly, 1/4" x 40"
23.	2404-08-08	Adapter, Straight
24.	2700-10	Bulkhead Tube Union, 7/8" - 14
25.	D4086	Tip, Pioneer Male
26.	6500-06	Elbow
27.	6400-06-08	Connector, O-Ring
28.	A1142	Hose Assembly, 1/4" x 196", 12 Row 30
	A1147	Hose Assembly, 1/4" x 222", 12 Row 36
	A1143	Hose Assembly, 1/4" x 234", 12 Row 38
29.	2501-06-08	Elbow

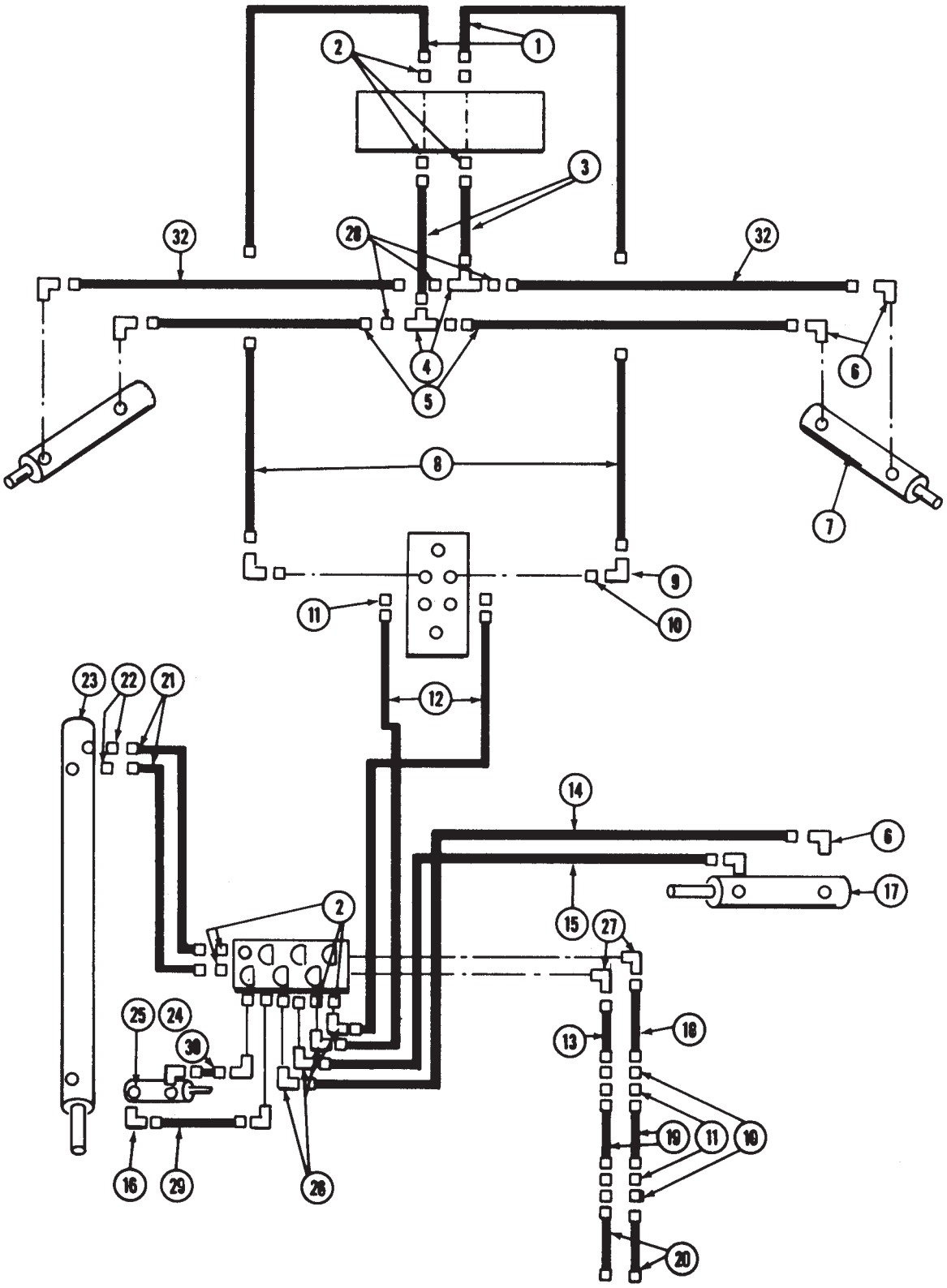
HYDRAULIC SYSTEM, MARKER, 16 Row 30



ITEM	PART NO.	DESCRIPTION
1.		Cylinder, See Marker Cylinder Page
2.	2500-08-08	Elbow
3.	A3106	Hose Assembly, 3/8" x 318"
4.	6600-08	Tee, Swivel
5.	6400-08	Connector, Male, O-Ring, 3/4 - 16
	6400-08-10	Connector, Male O-Ring, 3/4 - 16 x 7/8 - 14
6.	D4086	Tip, Pioneer Male
7.	A1076	Hose Assembly, 3/8" x 30"
8.	2700-08	Bulkhead Tube Union
9.	6500-08	Elbow, Swivel
10.	A1082	Hose Assembly, 3/8" x 19"
11.	306-08	Lock Nut, 3/4" - 16
12.	A3105	Hose Assembly, 3/8" x 170"
13.	A1092	Hose Assembly, 3/8' x 104"
14.	A3107	Hose Assembly, 3/8" x 170"

HYDRAULIC SYSTEM, ROTATE TO TRANSPORT

16 Row 30

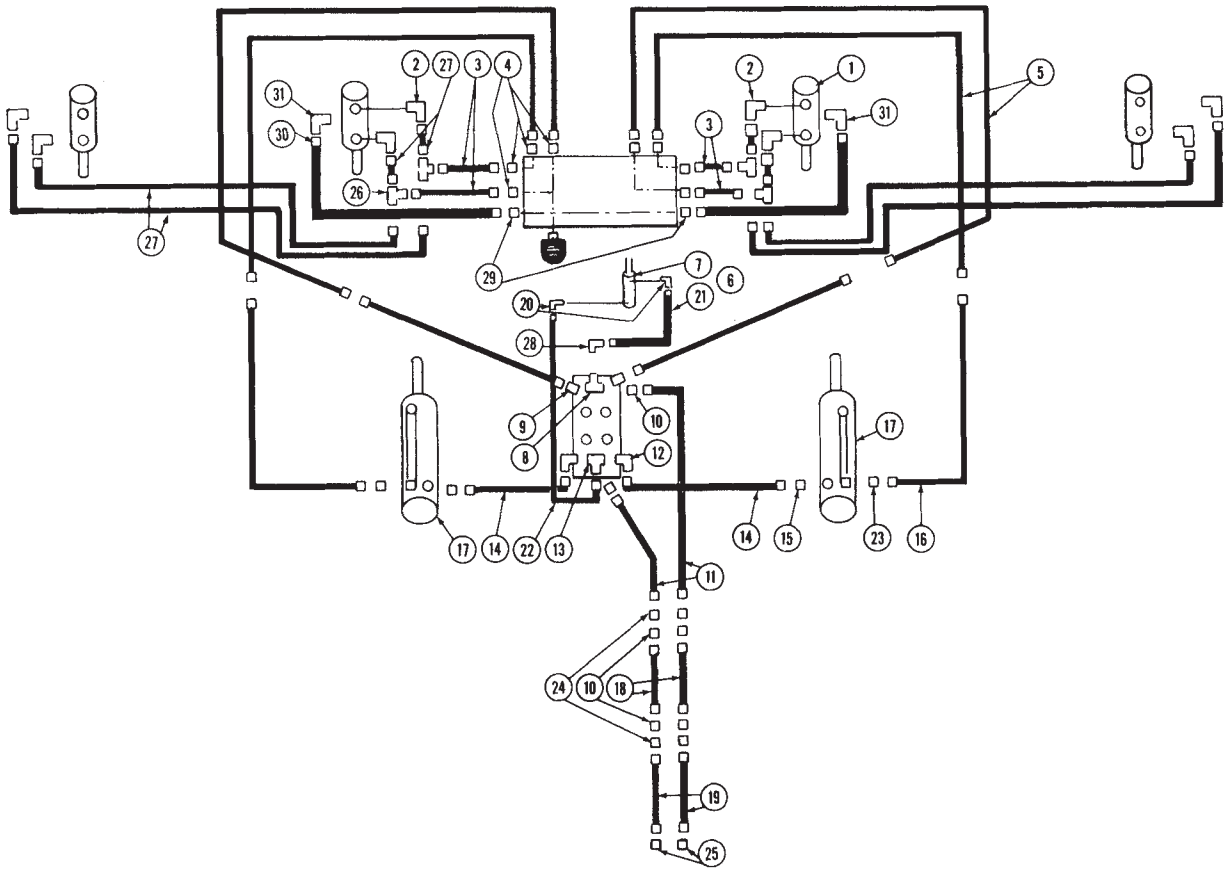


HYDRAULIC SYSTEM, ROTATE TO TRANSPORT

16 Row 30

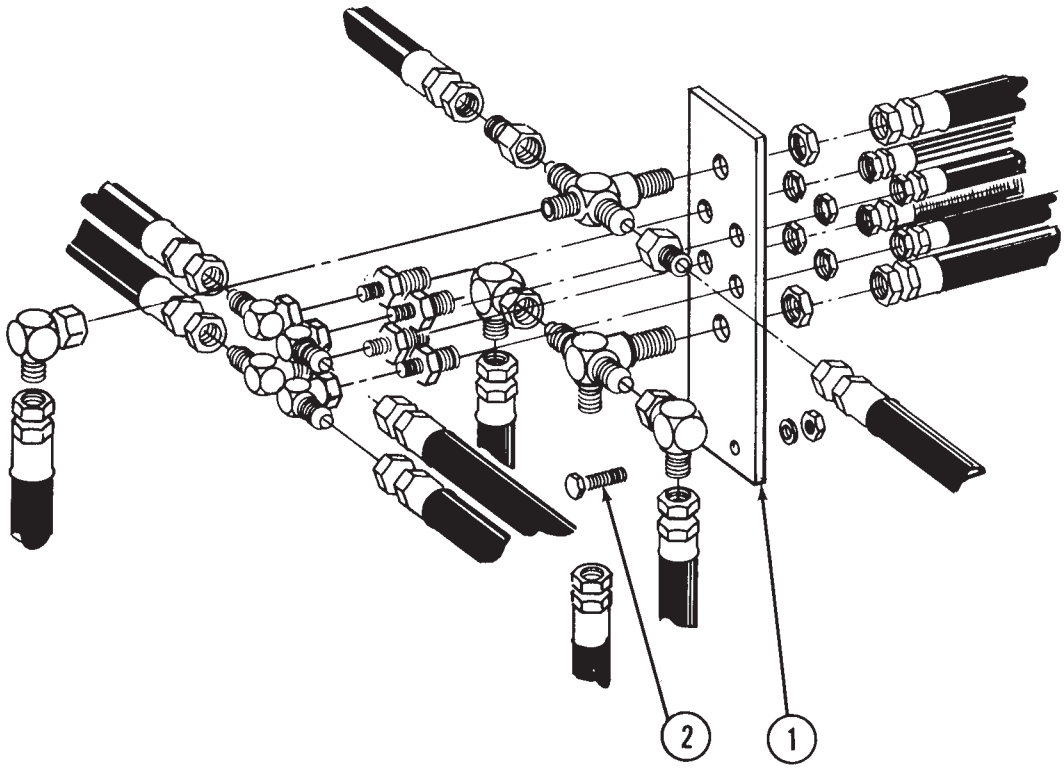
ITEM	PART NO.	DESCRIPTION
1.	A1085	Hose Assembly, 3/8" x 24 1/2"
2.	6400-08	Connector, Male O-Ring
3.	A1000	Hose Assembly, 3/8" x 15"
4.	2603-08	Tee, Tube
5.	A1132	Hose Assembly, 1/4" x 44"
6.	2501-06-08	Elbow
7.		Cylinder, See Wing Lock Cylinder Page
8.	A1083	Hose Assembly, 3/8" x 21"
9.	6500-08	Elbow, Swivel
10.	2700-08	Bulkhead, Tube Union, 3/4" - 16
11.	306-08	Lock Nut, 3/4" - 16
12.	A1049	Hose Assembly, 3/8" x 160"
13.	A1003	Hose Assembly, 3/8" x 27"
14.	A1133	Hose Assembly, 1/4" x 138"
15.	A1134	Hose Assembly, 1/4" x 116"
16.	2501-06 04	Elbow,
17.		Cylinder, See Rotation Cylinder Page
18.	A1076	Hose Assembly, 3/8" x 30"
19.	A1092	Hose Assembly, 3/8" x 104"
20.	A3107	Hose Assembly, 3/8" x 170"
21.	A1044	Hose Assembly, 3/8" x 34"
22.	2404-08-08	Adapter, Straight, Male
23.		Cylinder, See Tongue Cylinder Page
24.	6400-06-08	Connector, Male, O-Ring
25.		Cylinder, See Tongue Lock Cylinder Page
26.	6500-06	Elbow, Swivel
27.	6801-08	Elbow, O-Ring
28.	2406-08-06	Tube Reducer
29.	A1138	Hose Assembly 1/4" x 29"
30.	A1137	Hose Assembly, 1/4" x 23"
31.	D4086	Tip, Pioneer Male
32.	A1144	Hose Assembly, 1/4" x 54"

HYDRAULIC SYSTEM, PLANTER LIFT, 16 Row 30



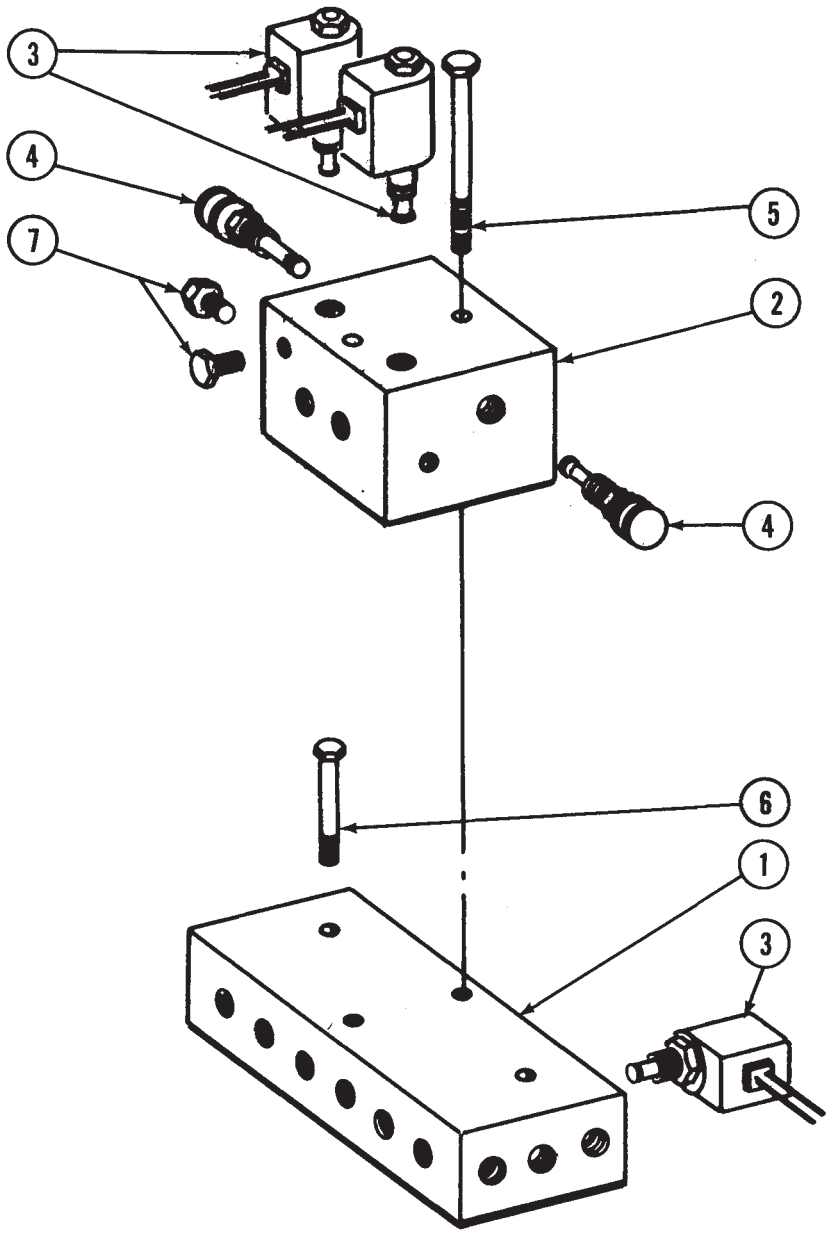
ITEM	PART NO.	DESCRIPTION
1.		Cylinder, See Wing Lift Cylinder Page
2.	2501-08-08	Elbow
3.	A1031	Hose Assembly, 3/8" x 234"
4.	6400-08	Connector, Male O-Ring
5.	A1085	Hose Assembly, 3/8" x 24 1/2"
6.	A1084	Hose Assembly, 3/8" x 23 1/4"
7.		Cylinder, See Lift Lock Cylinder Page
8.	A2645	Tee, Bulkhead
9.	2406-10-08	Tube, Reducer
10.	306-10	Lock Nut, 7/8" - 14
11.	A1416	Hose Assembly, 1/2" x 170"
12.	6500-10	Elbow, Swivel
13.	A2657	Tee, Bulkhead
14.	A1404	Hose Assembly, 1/2" x 41"
15.	2404-10-08	Adapter, Straight
16.	A1021	Hose Assembly, 3/8" x 56"
17.		Cylinder, See Center Section Lift Cylinder Page
18.	A1409	Hose Assembly, 1/2" x 104"
19.	A1418	Hose Assembly, 1/2" x 170"
20.	2501-06-04	Elbow
21.	A1140	Hose Assembly, 1/4" x 52"
22.	A1139	Hose Assembly, 1/4" x 40"
23.	2404-08-08	Adapter, Straight
24.	2700-10	Bulkhead Tube Union, 7/8" - 14
25.	D4086	Tip, Pioneer Male
26.	2603-08	Tee
27.	A1082	Hose Assembly, 3/8" x 19"
28.	6500-06	Elbow
29.	6400-06-08	Connector, O-Ring
30.	A1143	Hose Assembly, 1/4" x 234"
31.	2501-06-08	Elbow

MANIFOLD, OUTER BELL



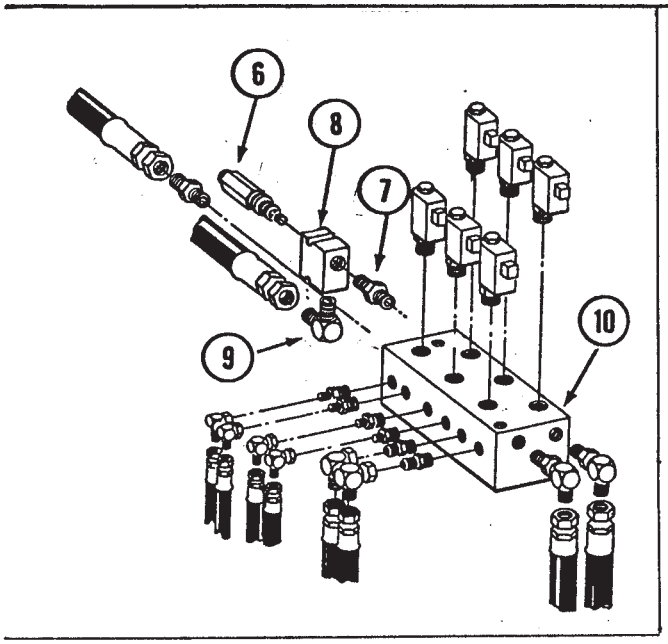
ITEM	PART NO.	DESCRIPTION
1.	D3724	Plate, Manifold
2.	10017	HHCS, 1/2"-13 x 1 1/2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2"-13

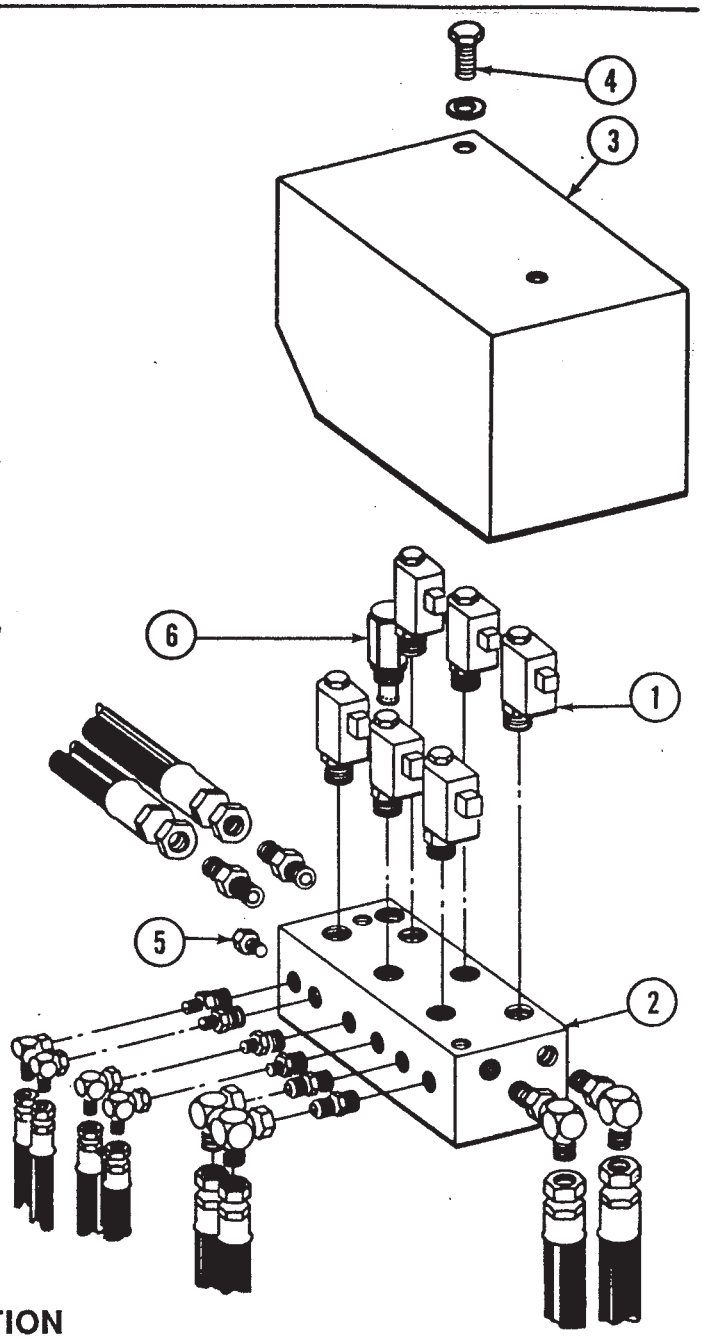
VALVE BLOCK, MAIN FRAME



ITEM	PART NO.	DESCRIPTION
1.	D4473	Junction Block
2.	D4474	Manifold Block
3.		Solenoid Valve, See Solenoid Valve Page
4.		Flow Control Valve, See Flow Control Valve Page
5.	10326	HHCS, 3/8" - 16 x 3 3/4"
	10229	Lock Washer, 3/8"
6.	10325	HHCS, 3/8" - 16 x 2 3/4"
	10229	Lock Washer, 3/8"
7.	10350	Pipe Plug

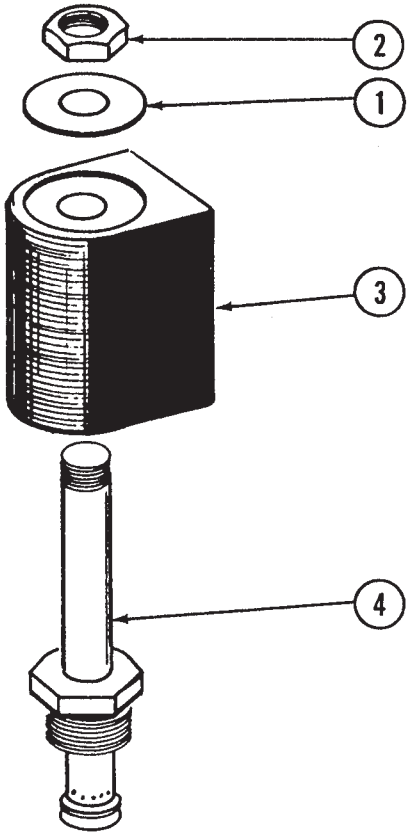
VALVE BLOCK, HITCH





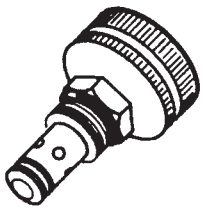
ITEM	PART NO.	DESCRIPTION
1.		See Solenoid Valve
2.	D4432	Manifold Block
3.	A3405	Cover
4.	10061	HHCS, 3/8"-16 x 3 1/2"
	10229	Lock Washer, 3/8"
5.	10350	Pipe Plug, 1/4"
6.		See Pressure Relief Valve
7.	6401-08-08	Adapter
8.	A3582	Valve Body
9.	2501-08-08	Elbow
10.	D3456	Block

SOLENOID VALVE



ITEM	PART NO.	DESCRIPTION
1.	R0760	Plate
2.	R0761	Hex Nut
3.	R0762	Coil
4.	R0763	Cartridge
A.	A2484	Solenoid Valve Complete
B.	R0764	Seal Kit, Includes: (2) O-Rings (1) Backup Ring

FLOW CONTROL VALVE

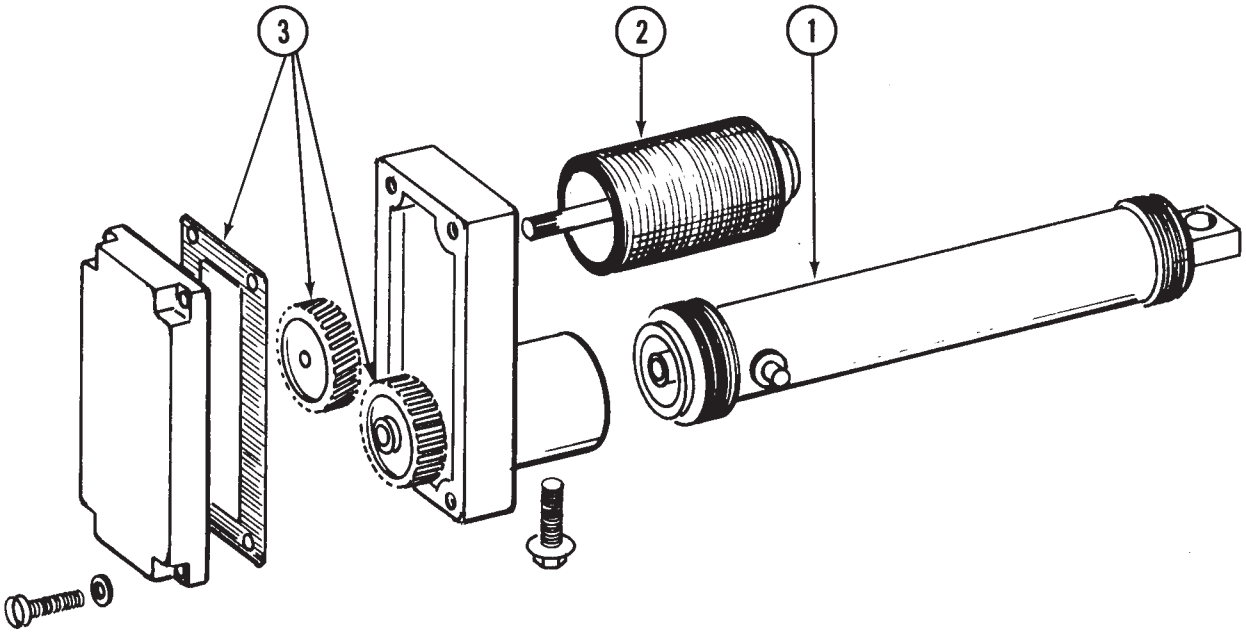


ITEM	PART NO.	DESCRIPTION
A.	A3413	Flow Control Valve
B.	R0764	Seal Kit

PRESSURE RELIEF VALVE

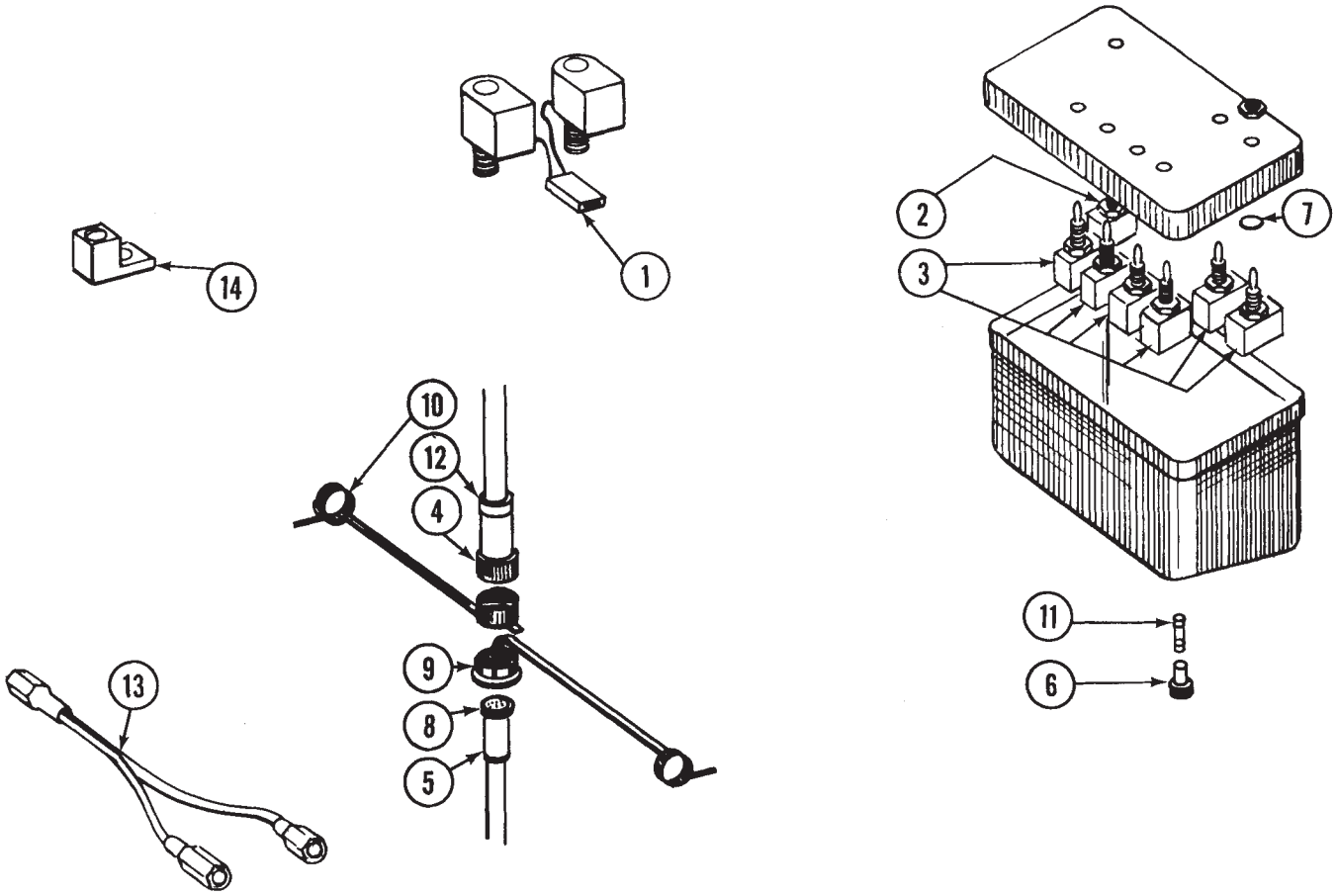
ITEM	PART NO.	DESCRIPTION
A.	A3407	Pressure Relief Valve, 1000 PSI
B.	R0764	Seal Kit

ACTUATOR



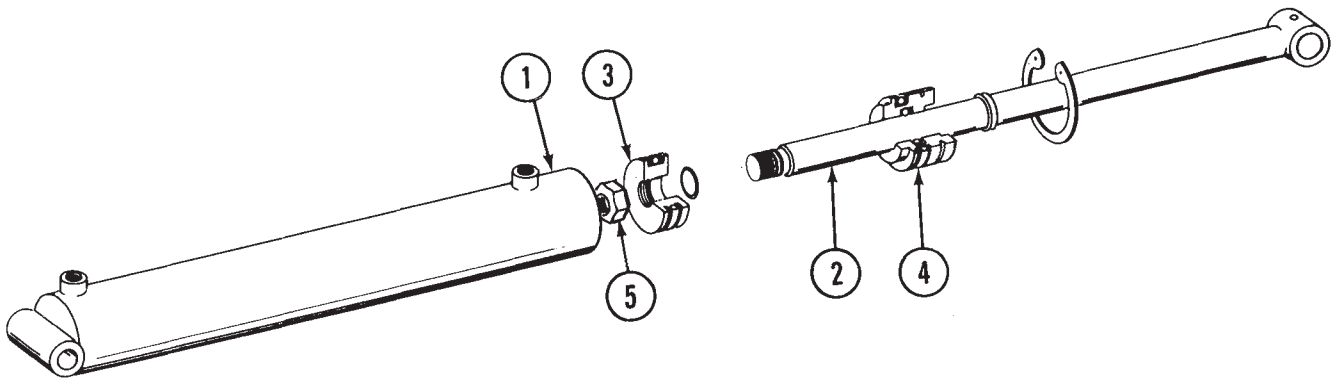
ITEM	PART NO.	DESCRIPTION
1.	R0719	Acutuator Kit, 4"
2.	R0720	Motor, Electric 12V DC
3.	R0848	Gear Set
A.	A3042	Actuator Complete, 1500 Lb.
B.	R0849	Motor and Gearbox Complete, Less Item 1 Actuator Kit

THREE VALVE ELECTRICAL KIT



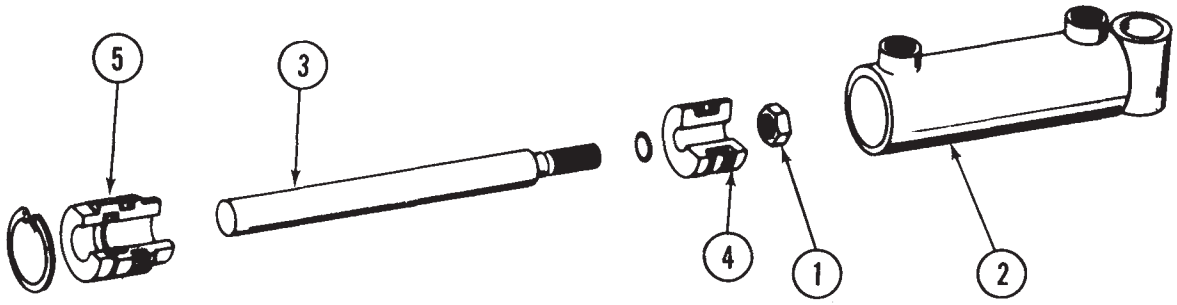
ITEM	PART NO.	DESCRIPTION
1.	10269	Terminal, Male Tab
2.	A2528	Switch, 3 Position Toggle
3.	A2526	Switch, 2 Way Momentary Contact
4.	A3491	Connector w/Coupling Ring
	R0807	Coupling Ring
5.	D4565	Connector
6.	A2612	Fuse Holder
7.	D3860	O-Ring
8.	D4613	Seal, Peripheral
9.	D4563	Dust Cap
10.	D4564	Dust Cover
11.	D2829	Fuse, AGC-15
12.	A3492	Cable Clamp w/Screws and Inserts
13.	A3589	Harness
14.	A3584	Clamp, Ground
A.	A3495	Control Box Assembly w/Short Harness
B.	A3933	Wiring Harness, 15' Extension (Optional)
C.	A3494	Wiring Harness, Tractor to Valve Block Assembly on Hitch, 12 Row 30
	A3750	Wiring Harness, Tractor to Valve Block Assembly on Hitch, 12 Row 36 and 38
	A3518	Wiring Harness, Tractor to Valve Block Assembly on Hitch, 16 Row 30
D.	A3496	Wiring Harness, Valve Block Assembly on Hitch to Valve Block Assembly on Main Frame
E.	A2901	Wiring Harness, Point Row (2 Per Planter), 12 Row 30
	A2808	Wiring Harness, Point Row (2 Per Planter), 12 Row 36 and 38
	A3751	Wiring Harness, Point Row (2 Per Planter), 16 Row 30

ROTATION CYLINDER



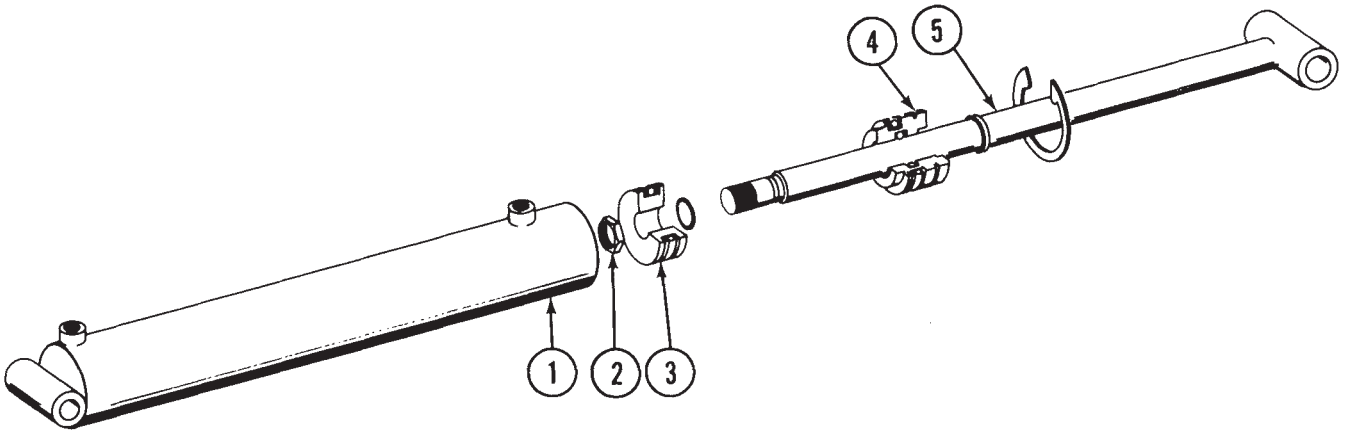
ITEM	PART NO.	DESCRIPTION
1.	A3441	Tube Assembly
2.	A3440	Shaft Assembly
3.	D4521	Piston
4.	D4509	Head Gland
5.	10509	Hex Jam Nut, 1 1/4" 12
A.	A3437	Cylinder, 3 1/3" x 20"
B.	R0778	Seal Kit

TONGUE LOCK CYLINDER
LIFT LOCK CYLINDER



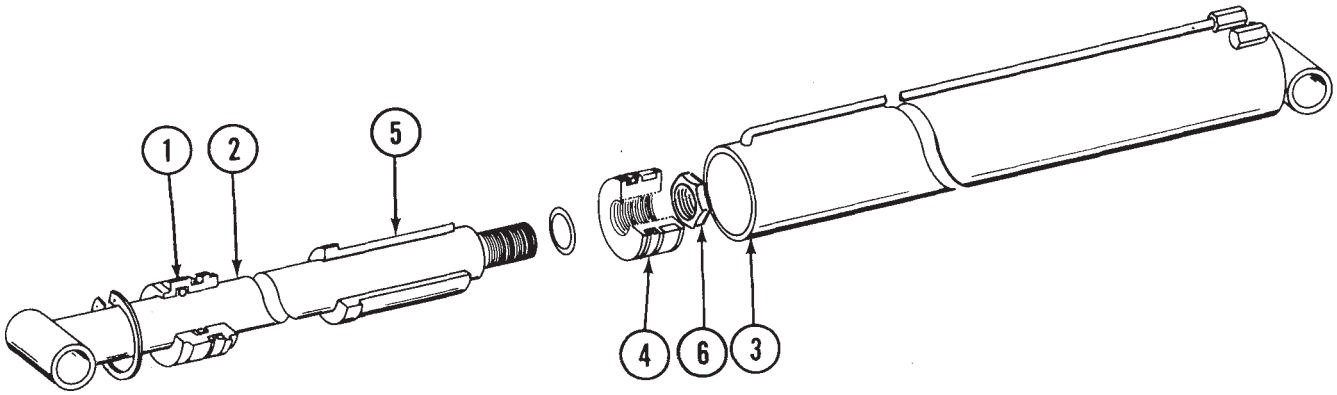
ITEM	PART NO.	DESCRIPTION
1.	10289	Hex Nut, 1/2" - 20
2.	A3442	Tube Assembly
3.	D4522-01	Shaft
4.	D4523	Piston
5.	D4524	Gland
A.	A3443	Cylinder, 1 1/2" x 2"
B.	R0777	Seal Kit

MARKER CYLINDER
WING LOCK CYLINDER



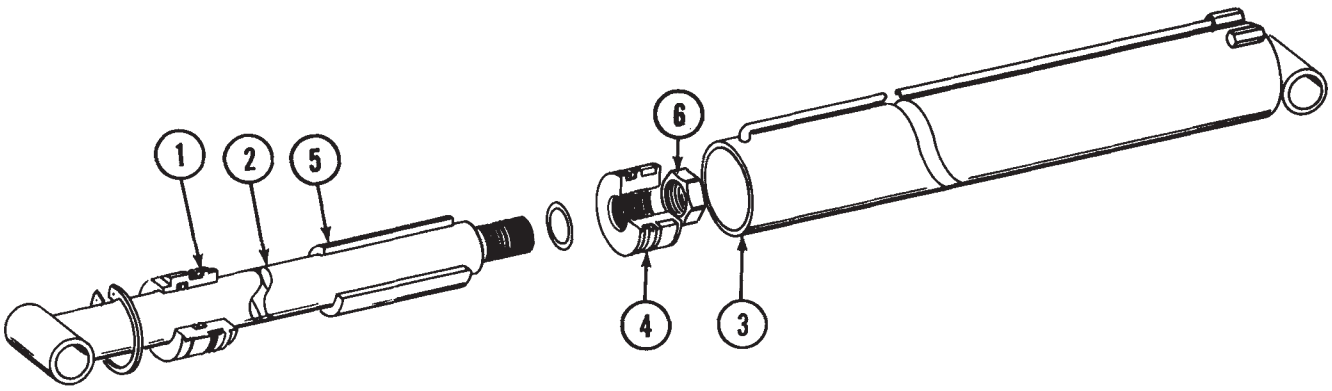
ITEM	PART NO.	DESCRIPTION
1.	A3449	Tube Assembly
2.	10189	Hex Nut, 7/8" - 14
3.	D4525	Piston
4.	D4526	Head Gland
5.	A3450	Shaft Assembly
A.	A3444	Cylinder, 2 1/2" x 20"
B.	R0784	Seal Kit

TONGUE CYLINDER, 12 Row 30



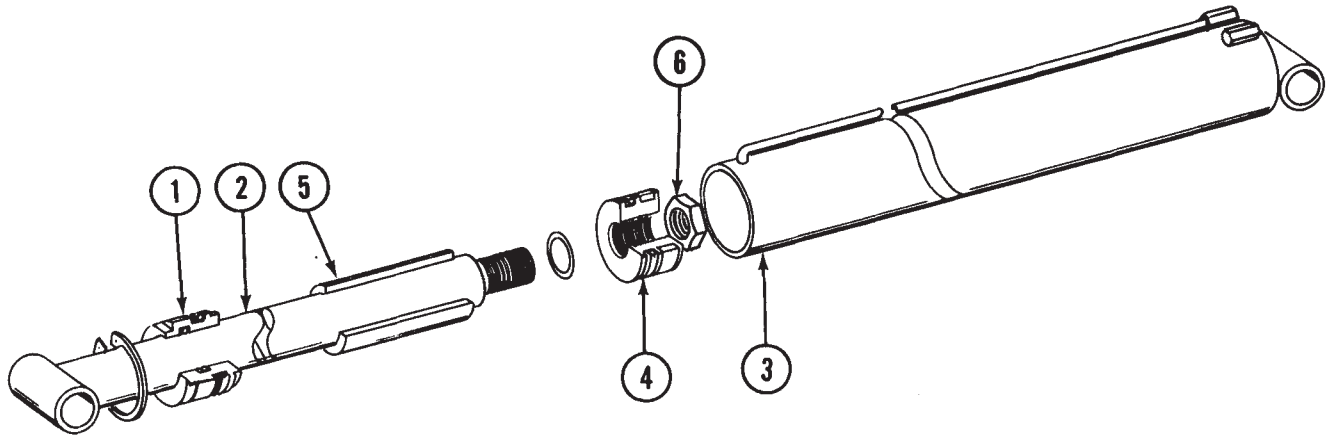
ITEM	PART NO.	DESCRIPTION
1.	D4528	Head Gland
2.	A3451	Shaft Assembly
3.	A3456	Tube Assembly
4.	D4527	Piston
5.	A3445	Stroke Collar
6.	10509	Hex Jam Nut, 1 1/4" - 12
A.	A3446	Cylinder, 3" x 68"
B.	R0790	Seal Kit

TONGUE CYLINDER, 12 Row Wide



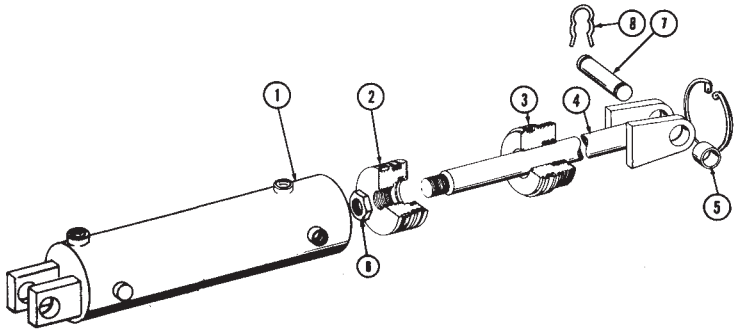
ITEM	PART NO.	DESCRIPTION
1.	D4559	Head Gland
2.	A3673	Shaft Assembly
3.	A3672	Tube Assembly
4.	D4558	Piston
5.	D4569-01	Stroke Collar
6.	10087	Hex Jam Nut, 1 1/2" - 12
A.	A3464	Cylinder, 3 1/2" x 88"
B.	R0795	Seal Kit

TONGUE CYLINDER, 16 Row 30



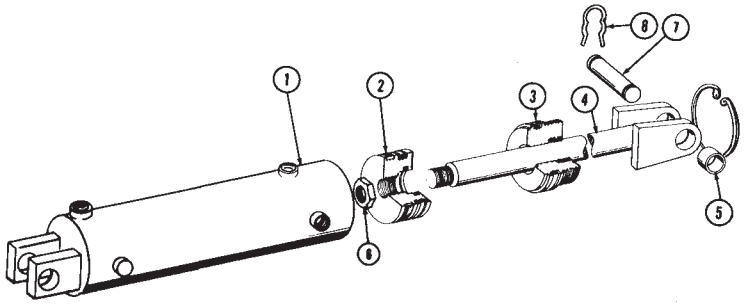
ITEM	PART NO.	DESCRIPTION
1.	D4559	Head Gland
2.	A3474	Shaft Assembly
3.	A3475	Tube Assembly
4.	D4558	Piston
5.	D4569-01	Stroke Collar
6.	10087	Hex Jam Nut, 1 1/2" - 12
A.	A3462	Cylinder, 3 1/2" x 98"
B.	R0795	Seal Kit

WING LIFT CYLINDER, 12 Row 30 and Wide



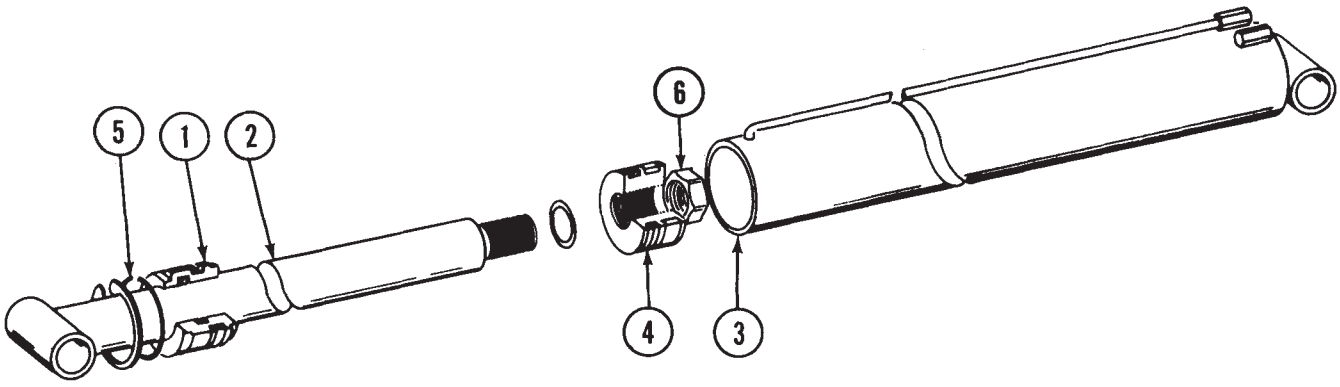
ITEM	PART NO.	DESCRIPTION
1.	A3473	Tube Assembly
2.	D4541	Piston
3.	D4542	Head Gland
4.	A3430	Shaft Assembly
5.	R0374	Bushing
6.	10509	Hex Jam Nut, 1 1/4" - 12
7.	R0375	Pin
8.	R0193	Clip
A.	A3448	Cylinder, 4" x 8", Less Pins and Clips
B.	R0791	Seal Kit

WING LIFT CYLINDER, 16 Row 30



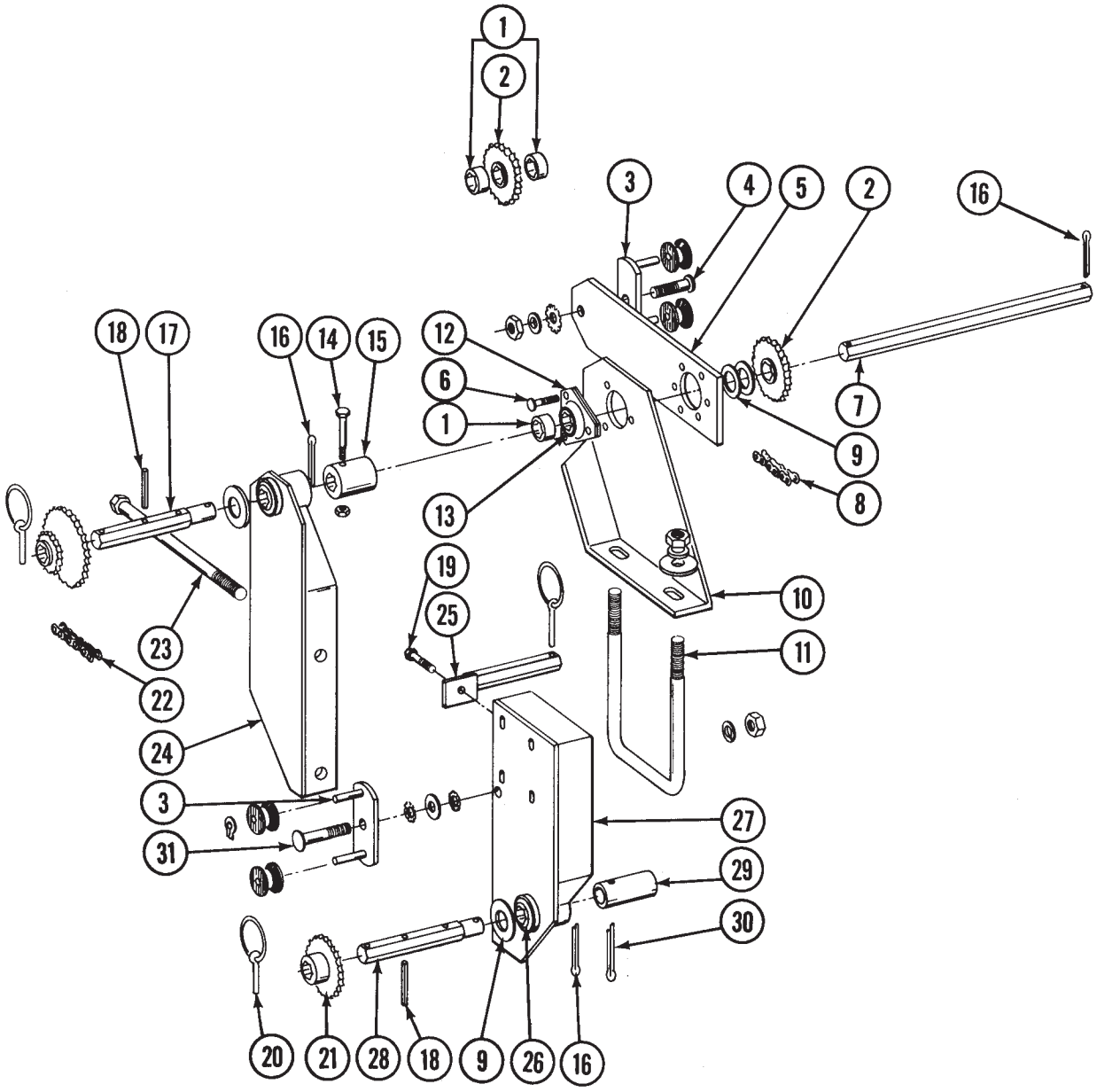
ITEM	PART NO.	DESCRIPTION
1.	A3477	Tube Assembly
2.	D4560	Piston
3.	D4561	Head Gland
4.	A3488	Shaft Assembly
5.	R0374	Bushing
6.	10324	Hex Jam Nut, 1" - 14
7.	R0375	Pin
8.	R0193	Clip
A.	A3461	Cylinder, 2 3/4" x 8", Less Pins and Clips
B.	R0794	Seal Kit

CENTER SECTION LIFT CYLINDER



ITEM	PART NO.	DESCRIPTION
1.	D4553	Head Gland
2.	A3469	Shaft Assembly
3.	A3470	Tube Assembly
4.	D4552	Piston
5.	R0793	Wire Ring
6.	10087	Hex Jam Nut, 1 1/2" - 12
A.	A3447	Cylinder, 4 1/2" x 20"
B.	R0792	Seal Kit

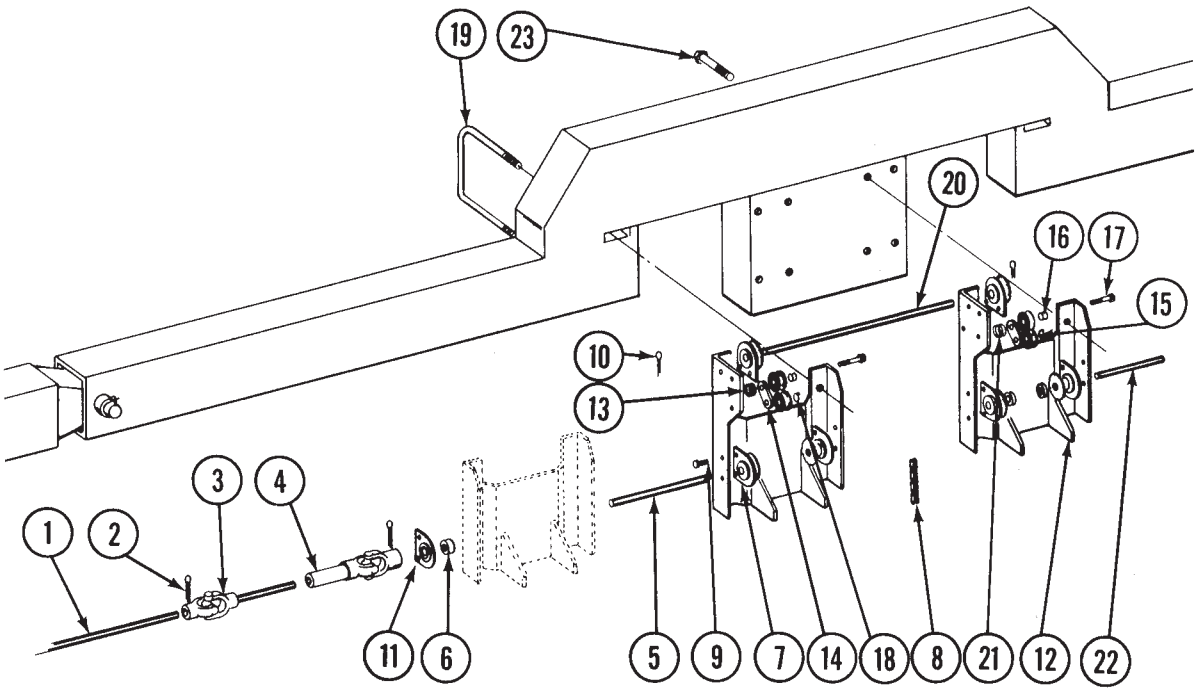
PUSH UNIT DRIVE AND TRANSMISSION ASSEMBLY



PUSH UNIT DRIVE AND TRANSMISSION ASSEMBLY

ITEM	PART NO.	DESCRIPTION
1.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16" - 18 x 1/2"
2.	2500-14	Sprocket, 24 Tooth
3.	A0289	Idler w/Spools and Rings
	D1067	Spool
	10435	Ring
4.	10313	Carriage Bolt, 1/2" - 13 x 1 1/2"
	10527	Washer, Internal/External, 1/2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
5.	D4762	Bracket, Idler
6.	10338	Carriage Bolt, 5/16" - 18 x 1 1/4"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
7.	D2548-16	Shaft, 16"
8.	3300-62	Chain, No. 2040, 62 Pitch Including Connector Link
	R0194	Connector Link, No. 2040
9.	10233	Machinery Bushing, 1"
10.	A1784	Support, R.H.
	A2721	Support, L.H. (Shown)
11.	D1134	U-Bolt, 7" x 5" x 5/8" - 11
	10217	Washer, 5/8" USS
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
12.	3400-01	Flangette
13.	2100-03	Bearing, 7/8 Hex Bore
14.	10339	HHCS, 5/16" - 18 x 2", Grade 2
	10109	Lock Nut, 5/16" - 18
15.	D4749	Coupler
16.	10463	Cotter Pin, 1/4" x 1 1/2"
17.	D4748	Shaft, 6 1/4"
18.	10602	Spring Pin, 1/4" x 1 1/2"
19.	10019	HHCS, 5/16" - 18 x 1"
	10109	Lock Nut, 5/16" - 18
20.	D2558	Lynch Pin, 1/4"
21.	2500-25	Sprocket, 14 Tooth
	2500-26	Sprocket, 18-28 Tooth
	2500-27	Sprocket, 16-30 Tooth
	2500-28	Sprocket, 22-26 Tooth
22.	3300-49	Chain, No. 2040, 49 Pitch Including Connector Link and Offset Link
	R0194	Connector Link, No. 2040
	R0199	Offset Link, No. 2040
23.	10012	HHCS, 5/8" - 11 x 6 1/2"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
24.	A3601	Transmission Mount, Rear, L.H.
	A3602	Transmission Mount, Rear, R.H. (Shown)
25.	A1782	Rod, Sprocket Storage
26.	2100-03	Bearing, 7/8 Hex Bore
27.	A3605	Transmission Mount, Front, L.H.
	A3606	Transmission Mount, Front, R.H. (Shown)
28.	D5215	Shaft, 6 3/8"
29.	D5212	Coupler, 1 3/4"
30.	10460	Cotter Pin, 1/4" x 2"
31.	10313	Carriage Bolt, 1/2" - 13 x 1 1/2"
	10527	Washer, Internal/External, 1/2"
	10216	Washer, 1/2" USS
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13

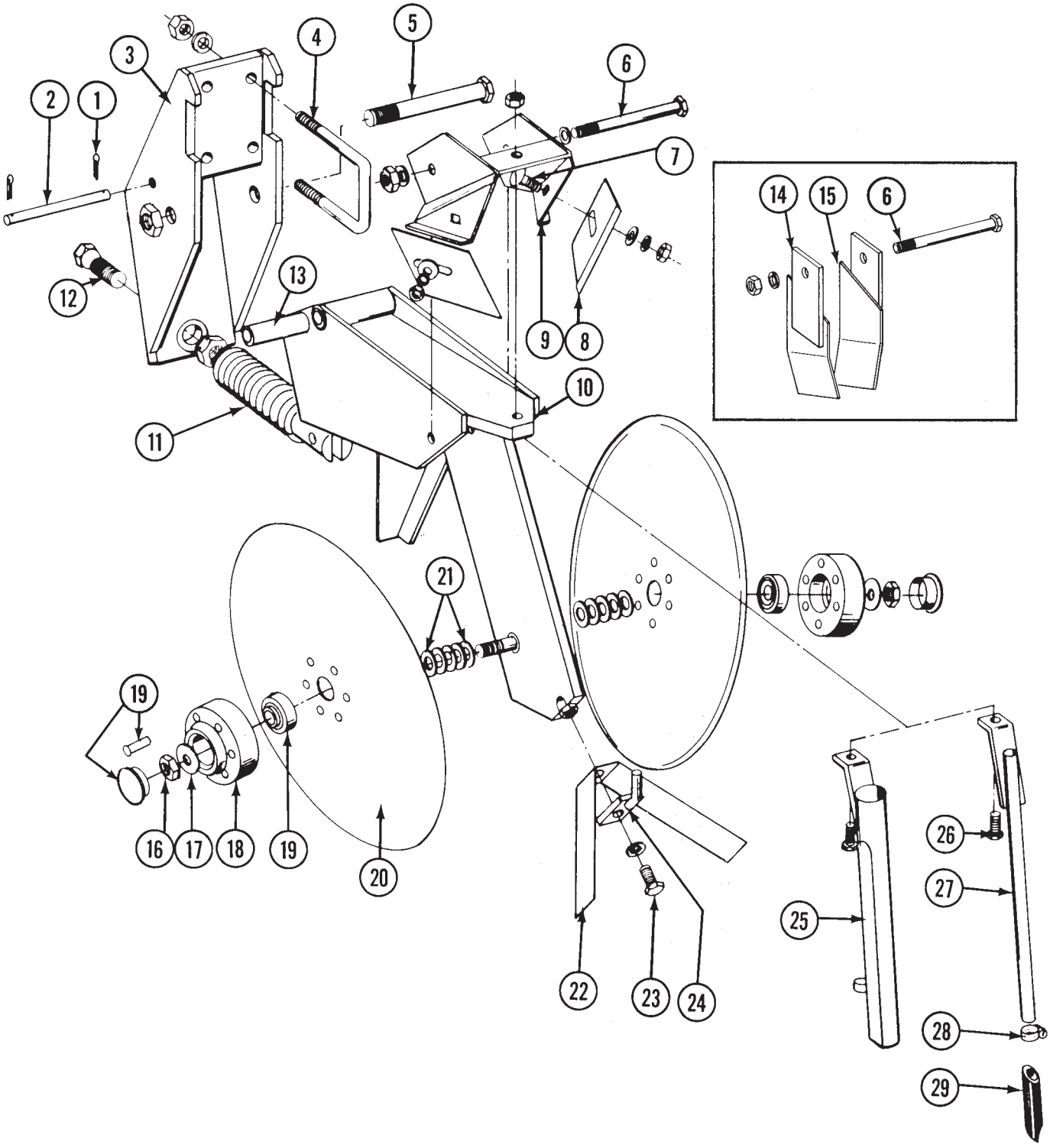
PUSH UNIT DRILL SHAFT DRIVE LINE



PUSH UNIT DRILL SHAFT DRIVE LINE

ITEM	PART NO.	DESCRIPTION
1.	D2548-93.5	Wing Shaft, 12 Row 30, R.H. and L.H.
	D2548-112	Wing Shaft, 12 Row 36, R.H. and L.H.
	D2548-117.5	Wing Shaft, 12 Row 38, R.H. and L.H.
	D2548-153.5	Wing Shaft, 16 Row 30, R.H. and L.H.
2.	10460	Cotter Pin, 1/4" x 2"
3.	A3646	Universal Joint w/Grease Fitting
	10343	Grease Fitting, 1/8" - 27, 90°
4.	A3647	Universal Joint w/Grease Fittings
	10640	Grease Fitting, 1/4" - 28
	10343	Grease Fitting, 1/8" - 27, 90°
5.	D2548-45	Shaft, 12 Row 30 and 16 Row 30, R.H.
	D2548-35	Shaft, 12 Row 30 and 16 Row 30, L.H.
	D2548-52.5	Shaft, 12 Row 36, R.H.
	D2548-42.5	Shaft, 12 Row 36, L.H.
	D2548-57.5	Shaft, 12 Row 38, R.H.
	D2548-47.5	Shaft, 12 Row 38, L.H.
6.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16" - 18 x 1/2"
7.	A1720	Bearing/Sprocket, 7/8" Hex
8.	3303-67	Chain, No. 41, 67 Pitch Including Connector and Offset Link
	R0196	Connector Link, 41
	R0201	Offset Link, No. 41
9.	10001	HHCS, 3/8" - 16 x 1"
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
10.	10463	Cotter Pin, 1/4" x 1 1/2"
11.	A2180	Hanger Bearing, 7/8" Hex
12.	A3617	Mounting Plate, Special
13.	D1065	Spring
14.	A2056	Idler, Less Spools and Rings
15.	D1068	Spool
16.	D1026	Bushing
17.	10061	HHCS, 3/8" - 16 x 3 1/2"
	10210	Washer, 3/8" USS
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
18.	10435	Ring
19.	D3887	U-Bolt, Special, 5" x 7" x 5/8" - 11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
20.	D4775	Shaft, 12 Row 30 and 16 Row 30, 33 1/4"
	D4962	Shaft, 12 Row 36, 39 1/4"
	D4969	Shaft, 12 Row 38, 41 1/4"
21.	D2134	Spring
22.	D0914-12.25	Shaft
23.	10007	HHCS, 5/8" - 11 x 1 1/2"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11

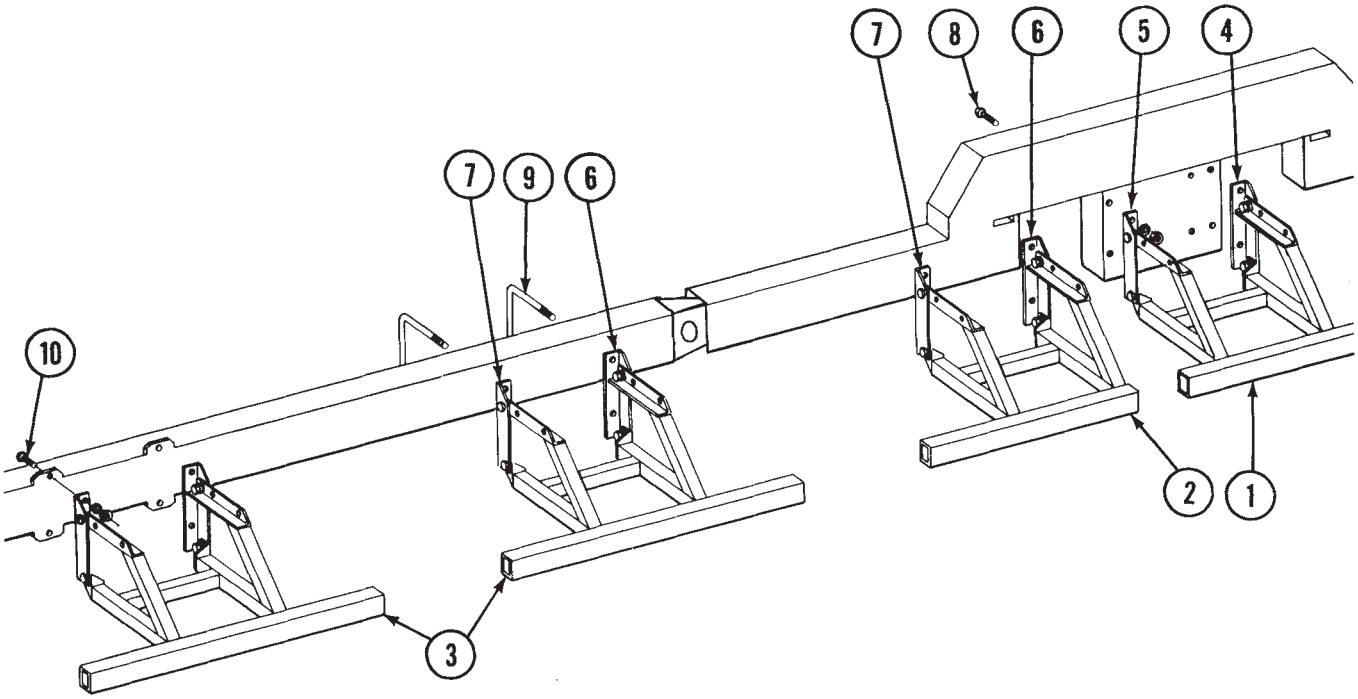
FERTILIZER OPENER

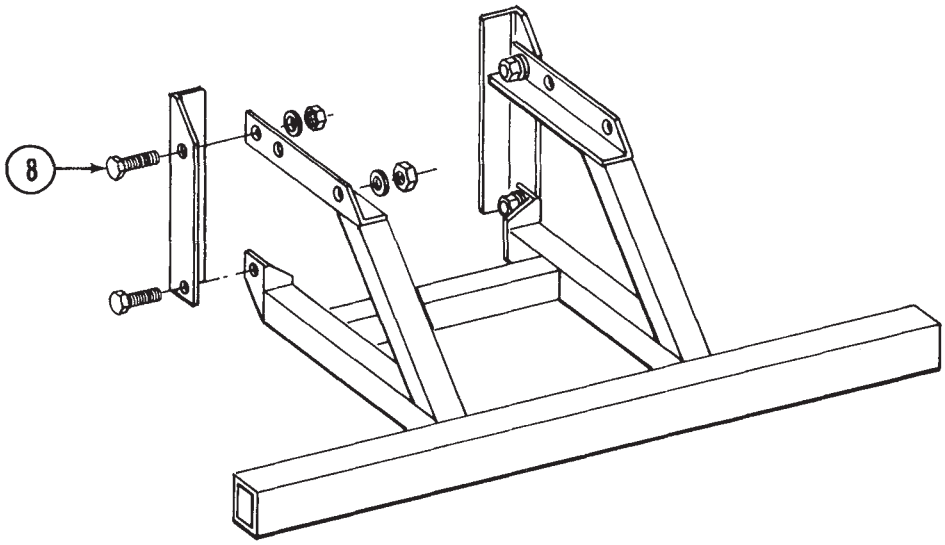


FERTILIZER OPENER

ITEM	PART NO.	DESCRIPTION
1.	10451	Cotter Pin, 1/8" x 1"
2.	D1657	Pin, Lockup
3.	A0785	Bracket, Mounting
4.	D1339	U-Bolt, 2 1/2" x 2 1/2"x1/2"-13
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2"-13
5.	10046	HHCS, 5/8" - 11 x 5"
	10107	Lock Nut, 5/8" - 11
6.	10045	HHCS, 1/2" - 13 x 4 1/2"
	10216	Flat Washer, 1/2"
	10111	Lock Nut, 1/2" - 13
7.	10305	Carriage Bolt, 3/8" - 16 x 1"
	10210	Flat Washer 3/8" USS
	10229	Lock Washer, 3/8"
	10101	Hex Nut, 3/8" - 16
8.	D1673	Scraper, Standard
9.	A0810	Scraper Mount, Standard
10.	A0308	Shank
11.	A0328	Spring
12.	D0962	Hex Head Adjusting Bolt, 5/8" -18
	10499	Jam Nut, 5/8" - 18
13.	D0487	Bushing
14.	A3665	Scraper, L.H., Special
15.	A3666	Scraper, R.H., Special
16.	10503	Jam Nut, R.H., 5/8" - 11
	10504	Jam Nut, L.H., 5/8" - 11
17.	10204	Machinery Bushing, 21/32"
18.	B0134	Hub
19.	1K139	Bearing W/Cap and Rivets
	D1132	Cap
	10651	Rivet, 1/4" x 1 3/8"
20.	D1030	Blade
21.	10213	Machine Bushing, 11/16"
22.	D2589	Scraper, Inner
23.	10019	HHCS 5/16" - 18 x 1"
	10232	Lock Washer, 5/16"
24.	A0312	Mount
25.	A1369	Drop Tube, Dry Fertilizer
26.	10133	HHCS, 5/16" - 18 x 1 1/2"
	10109	Lock Nut, 5/16" - 18
27.	A0318	Drop Tube, Liquid Fertilizer
28.	10681	Clamp, Hose, No. 6
29.	D1797	Extension
A.	A0320	Disk and Bearing Assembly (Includes Items 18-20)
B.	6156X	Double Disk Fertilizer Opener With U-Bolts, Less Drop Tubes (Standard Scrapers)

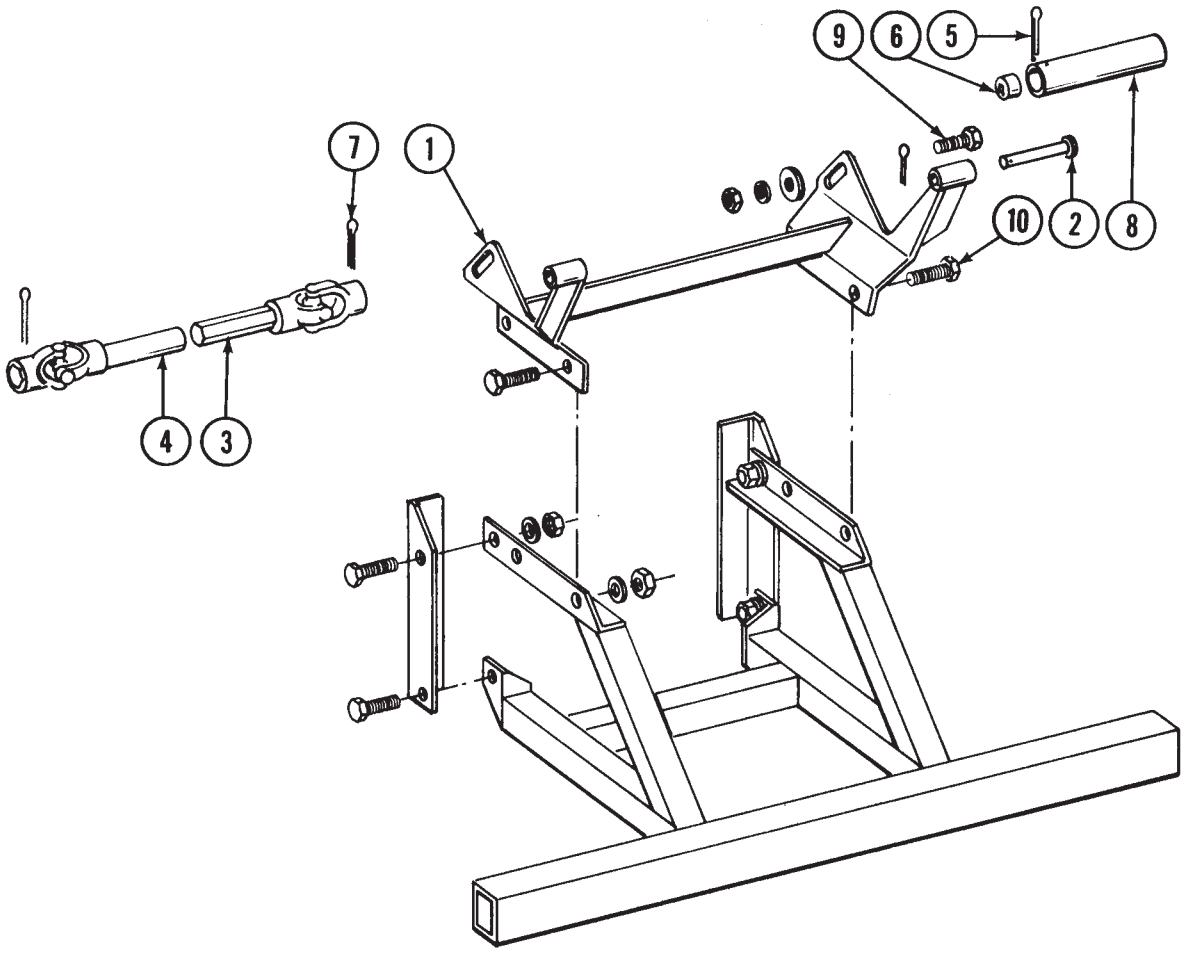
OPENER MOUNTS





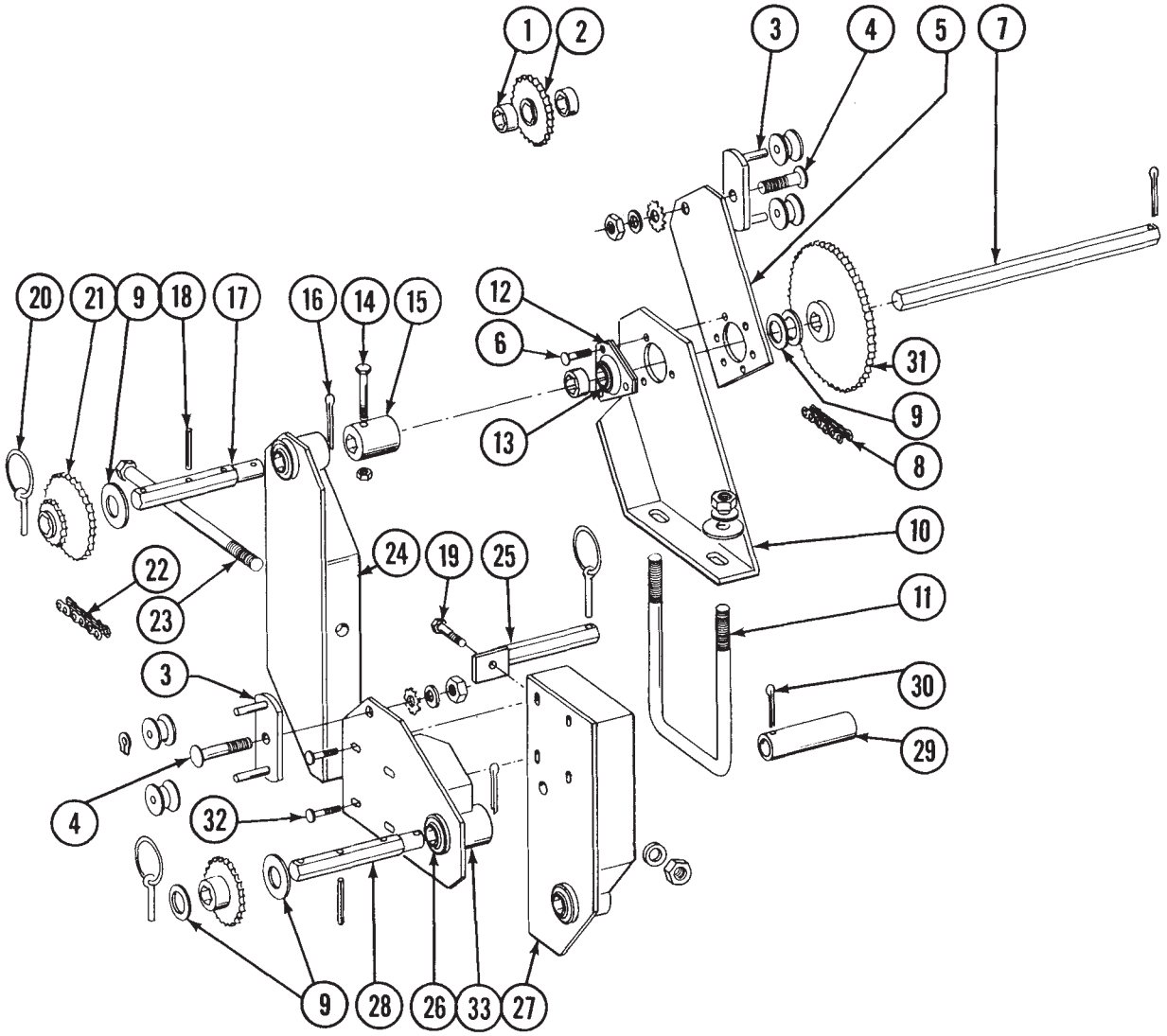
ITEM	PART NO.	DESCRIPTION
1.	A3621	Opener Mount, Center
2.	A3622	Opener Mount, R.H. (Shown)
	A3623	Opener Mount, L.H.
3.	A3624	Opener Mount, Standard
4.	D2298	Angle, Center Row, L.H.
5.	D1022L	Angle, Center Row, R.H.
6.	D4782	Angle, L.H.
7.	D4781	Angle, R.H.
8.	10007	HHCS, 5/8" - 11 x 1 1/2"
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
9.	D1747	U-Bolt, 3/4" - 10 x 5" x 7"
	10231	Lock Washer, 3/4"
	10105	Hex Nut, 3/4" - 10
10.	D4811	Special Cap Screw, 3/4" - 10 x 2"
	10231	Lock Washer, 3/4" - 10
	10105	Hex Nut, 3/4" - 10

DRY FERTILIZER COUPLERS AND HOPPER MOUNT



ITEM	PART NO.	DESCRIPTION
1.	A3627	Hopper Support
2.	10561	Clevis Pin, 1/2" x 3"
	10451	Cotter Pin, 1/8" x 1"
3.	A3654	Universal Joint w/Shaft and Grease Fitting, 12 Row 30 and 16 Row 30
	A3769	Universal Joint w/Shaft and Grease Fitting, 12 Row 36
	A3767	Universal Joint w/Shaft and Grease Fitting, 12 Row 38
	10343	Grease Fitting, 1/8" - 27, 90°
4.	A3655	Universal Joint w/Shaft and Grease Fittings, 12 Row 30 and 16 Row 30
	A2761	Universal Joint w/Shaft and Grease Fiting, 12 Row 36 and 12 Row 38
	10343	Grease Fitting, 1/8" - 27, 90°
	10641	Grease Fitting, 1/8"
	10640	Grease Fitting, 1/4"-28
5.	10462	Cotter Pin, 3/16" x 2"
6.	D2768	Insert, Square
7.	10460	Cotter Pin, 1/4" x 2"
8.	A3599	Coupler, 16", 12 Row 30 and 16 Row 30
	A3770	Coupler, 27 5/8", 12 Row 36
	A3768	Coupler, 31 5/8", 12 Row 38
9.	10037	HHCS, 1/2" - 13 x 1 1/4"
	10206	Washer, 1/2" SAE
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
10.	10017	HHCS, 1/2" - 13 x 1 1/2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13

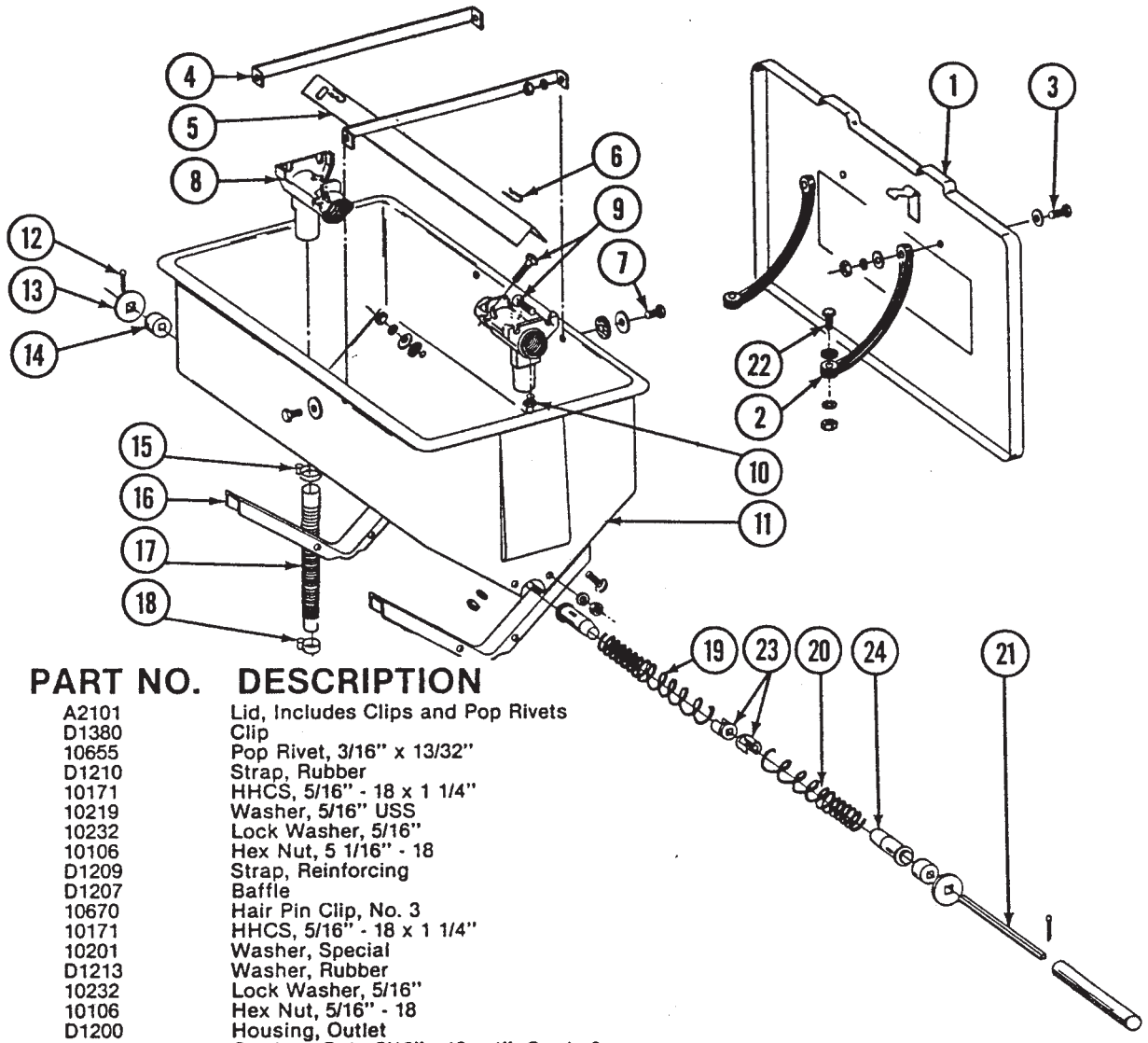
DRY FERTILIZER TRANSMISSION AND DRIVE LINE



DRY FERTILIZER TRANSMISSION AND DRIVE LINE

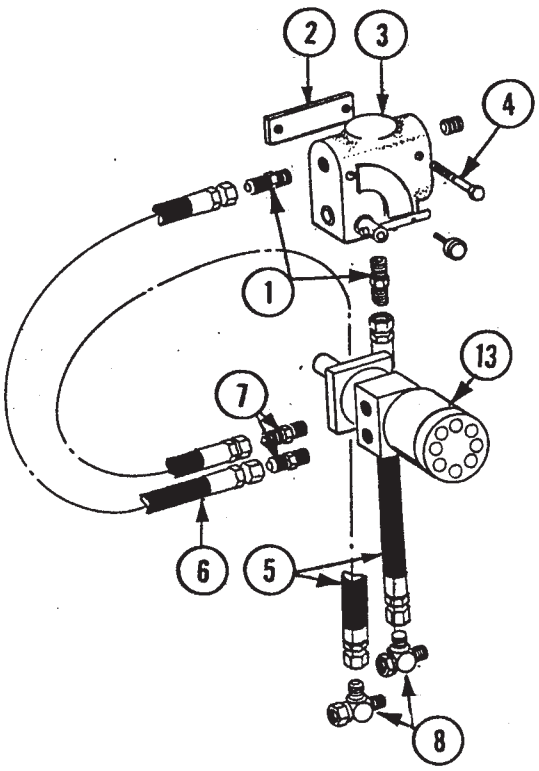
ITEM	PART NO.	DESCRIPTION
1.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16"-18 x 1/2"
2.	2500-14	Sprocket, 24 Tooth
3.	A0289	Idler w/Spools and Rings
	D1067	Spool
	10435	Ring
4.	10313	Carriage Bolt, 1/2"-13 x 1 1/2"
	10527	Washer, Internal/External, 1/2"
	10216	Washer, 1/2"
	10102	Hex Nut, 1/2"-13
5.	D4762	Bracket, Idler
6.	10338	Carriage Bolt, 5/16"-18 x 1 1/4"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16"-18
7.	D2548-16	Shaft, 16"
8.	3300-62	Chain, No. 2040, 62 Pitch Including Connector Link
	3300-06	Chain, No. 2040, 6 Pitch Including Connector Link
	R0194	Connector Link, No. 2040
9.	10233	Machinery Bushing, 1"
10.	A1784	Support, R.H.
	A2721	Support, L.H.(Shown)
11.	D1134	U-Bolt, 7" x 5" x 5/8"-11
	10217	Washer, 5/8" USS
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8"-11
12.	3400-01	Flangette
13.	2100-03	Bearing, 7/8 Hex Bore
14..	10339	HHCS, 5/16"-18 x 2", Grade 2
	10109	Lock Nut, 5/16"-18
15.	D4749	Coupler
16.	10463	Cotter Pin, 1/4" x 1 1/2"
17.	D4922	Shaft, 6 5/8", Used with 1 5/8" sprocket
	D4748	Shaft, 6 3/8", Used with 1 3/8" sprocket
18.	10602	Spring Pin, 1/4" x 1 1/2"
19.	10019	HHCS, 5/16"-18
	10109	Lock Nut, 5/16"-18
20.	D2558	Lynch Pin, 1/4"
21.	2500-03	Sprocket, 16-30 Tooth, 1 5/8"
	2500-12	Sprocket, 18-36 Tooth, 1 5/8"
	2500-14	Sprocket, 24 Tooth, 1 5/8"
	2500-27	Sprocket, 16-30 Tooth, 1 3/8"
	2500-36	Sprocket, 18-36 Tooth, 1 3/8"
	2500-37	Sprocket, 24 Tooth, 1 3/8"
22.	3300-52	Chain, No. 2040, 52 Pitch Including Connector Link
	R0194	Connector Link, No. 2040
23.	10012	HHCS, 5/8"-11 x 6 1/2"
	10230	Lock Washer, 5/8"-11
	10104	Hex Nut, 5/8"-11
24.	A3603	Transmission Mount W/Bearings, Rear, L.H.
	A3604	Transmission Mount W/Bearings, Rear, R.H.(Shown)
25.	A1786	Rod, Sprocket Storage
26.	A5116	Bearing, 7/8 Hex Bore
27.	A3607	Transmission Mount W/Bearings, Front, L.H.
	A3608	Transmission Mount W/Bearings, Front, R.H.(Shown)
28.	D5214	Shaft, 7 1/8", Used with 1 5/8" sprocket
	D5765	Shaft, 6 7/8", Used with 1 3/8" sprocket
29.	D5218	Coupler, 4"
30.	10460	Cotter Pin, 1/4" x 2"
31.	B0138	Sprocket, 48 Tooth
32.	10305	Carriage Bolt, 3/8"-16 x 1"
	10210	Washer, 3/8"
	10229	Lock Washer, 3/8"-16
	10101	Hex Nut, 3/8"-16
33.	A3614	Mounting Plate W/Bearings, R.H.(Shown)
	A3615	Mounting Plate W/Bearings, L.H.

DRY FERTILIZER HOPPER

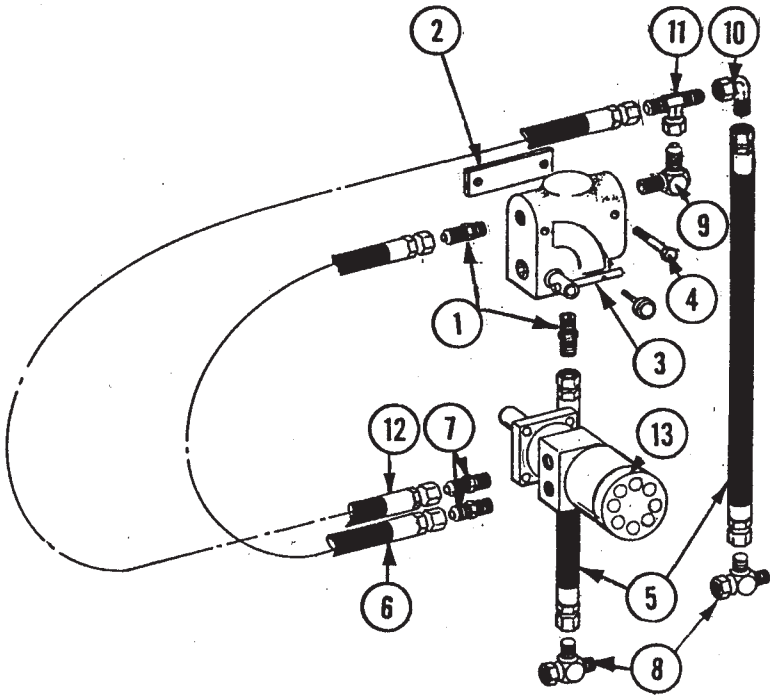


ITEM	PART NO.	DESCRIPTION
1.	A2101	Lid, Includes Clips and Pop Rivets
	D1380	Clip
	10655	Pop Rivet, 3/16" x 13/32"
2.	D1210	Strap, Rubber
3.	10171	HHCS, 5/16" - 18 x 1 1/4"
	10219	Washer, 5/16" USS
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5 1/16" - 18
4.	D1209	Strap, Reinforcing
5.	D1207	Baffle
6.	10670	Hair Pin Clip, No. 3
7.	10171	HHCS, 5/16" - 18 x 1 1/4"
	10201	Washer, Special
	D1213	Washer, Rubber
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
8.	D1200	Housing, Outlet
9.	10303	Carriage Bolt, 5/16" - 18 x 1", Grade 2
	10219	Washer, 5/16" USS
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
10.	10641	Grease Fitting, 1/8" NPT, 45°
11.	D1379	Hopper
12.	10464	Cotter Pin, 3/16" x 1"
13.	D1212	Washer, Special
14.	D1206	Bearing
15.	10676	Clamp, No. 36
16.	D1208	Saddle
17.	D3790	Tube, Rubber
18.	10672	Clamp, No. 28
19.	D1204	Spring, R.H., Regular Rate
	D4476	Spring, R.H., High Rate
20.	D1205	Spring, L.H., Regular Rate
	D4477	Spring, L.H., High Rate
21.	D3709	Shaft, 45 1/2"
	D3708	Shaft, 46"
22.	10133	HHCS, 5/16" - 18 x 1 1/2"
	10219	Washer, 5/16" USS
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
23.	D1203	Plug
24.	D1202	Guide

DRY FERTILIZER QUICK FILL HYDRAULIC SYSTEM



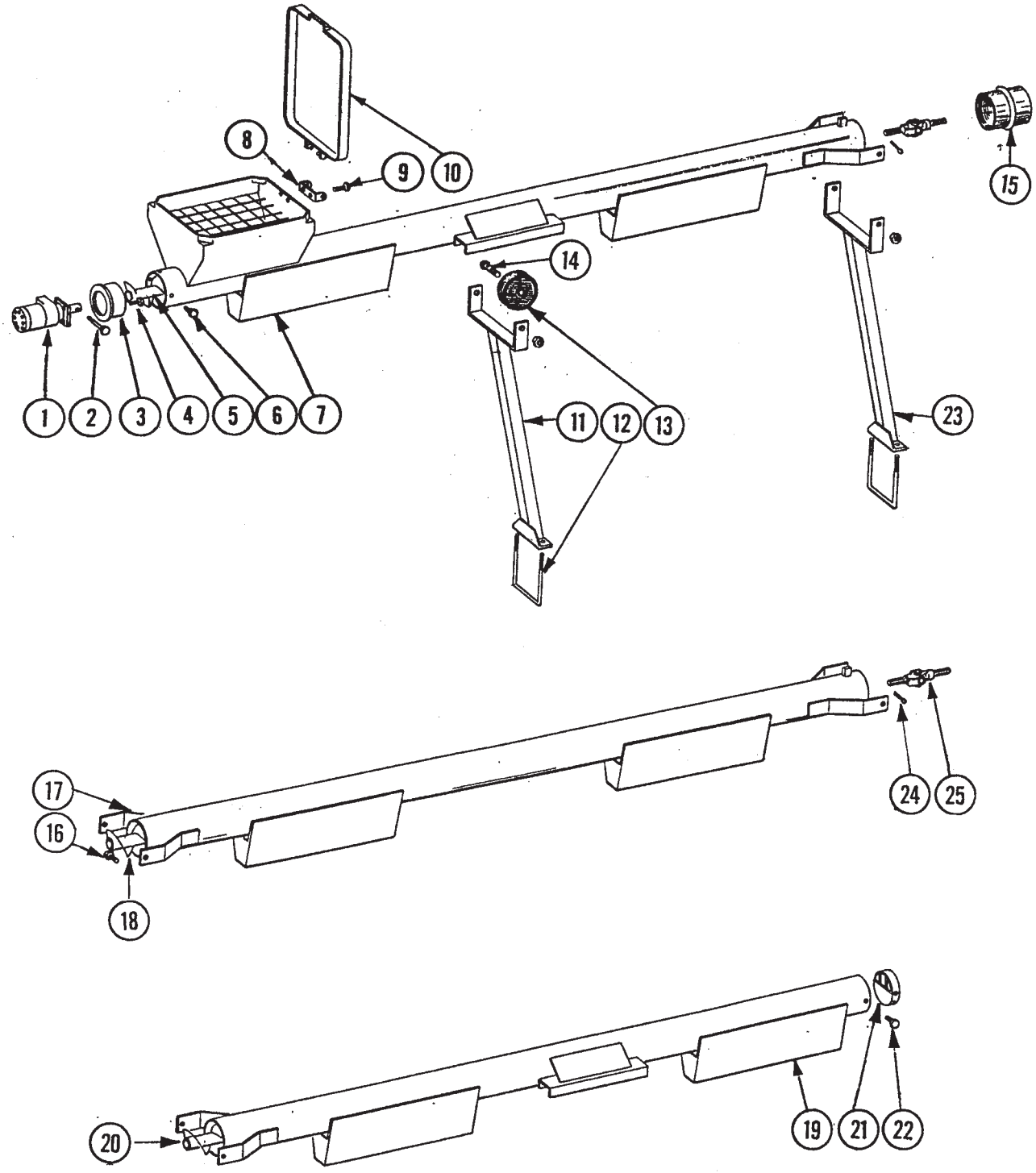
Closed Center System



Open Center System

ITEM	PART NO.	DESCRIPTION
1.	2404-10-08	Adapter, 7/8"-14 Male 37° JIC to 2 1/2" NPT
2.	D6244	Spacer
3.	A5374	Flow Control Valve
4.	10403	HHCS, 1/4"-20 x 2 1/2"
	10227	Lock Washer, 1/4"
	10103	Hex Nut, 1/4"-20
5.	A1452	Hose Assembly, 1/2" x 350", 12 Row 30
	A1451	Hose Assembly, 1/2" x 390", 12 Row 36
	A1453	Hose Assembly, 1/2" x 400", 12 Row 38
	A1454	Hose Assembly, 1/2" x 420", 16 Row 30
6.	A1450	Hose Assembly, 1/2" x 22"
7.	6400-10	Connector, 7/8"-14 Male 37° JIC to 7/8"-14 O-ring
8.	6602-10	Swivel Run Tee, 7/8"-14 Male/Female 37° JIC
9.	250I-10-08	Elbow, 7/8"-14 Male 37° JIC to 1/2" NPT
10.	6501-10	Swivel Elbow, 7/8"-14 Male 37° JIC to Female
11.	6600-10	Swivel Outlet Tee, 7/8"-14 Male/Female 37° JIC
12.	A1424	Hose Assembly, 1/2" x 30"
13.	A5163	Motor

DRY FERTILIZER QUICK FILL ASSEMBLY



26

⚠ DANGER

- ROTATING AUGER -

KEEP CLOTHING, YOURSELF AND OTHERS WELL CLEAR WHEN OPERATING

27

KINZE®

28

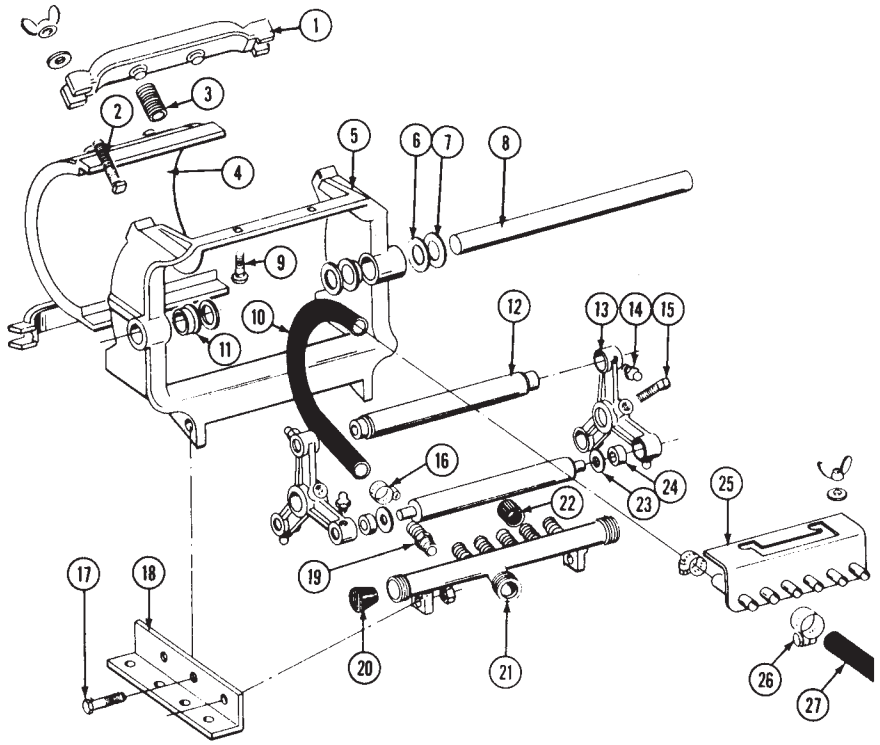
⚠ CAUTION ⚠

AGRICULTURAL CHEMICALS CAN BE DANGEROUS. IMPROPER SELECTION OR USE CAN SERIOUSLY INJURE PERSONS, ANIMALS, PLANTS, SOIL OR OTHER PROPERTY. BE SAFE: SELECT THE RIGHT CHEMICAL FOR THE JOB. HANDLE IT WITH CARE. FOLLOW THE INSTRUCTIONS ON THE CONTAINER LABEL AND OF THE EQUIPMENT MANUFACTURER.

DRY FERTILIZER QUICK FILL ASSEMBLY

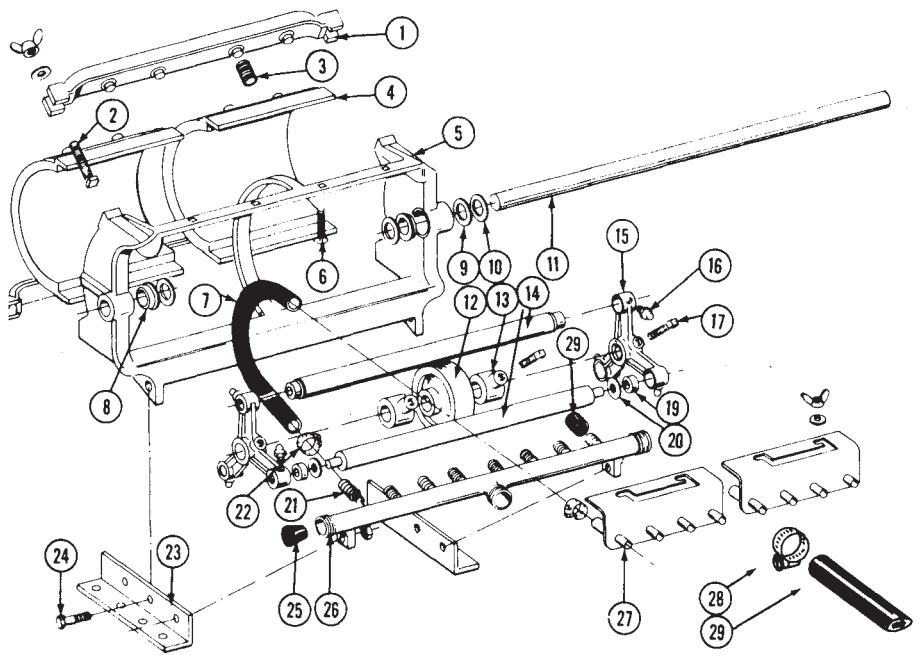
ITEM	PART NO.	DESCRIPTION
1.		Motor, See Dry Fertilizer Quick Fill Hydraulic System
2.	10041	HHCS, 5/16"-18 x 2"
	10109	Lock Nut, 5/16"-18
3.	B0174	Motor Mount
4.	10004	HHCS, 3/8"-16 x 1 1/4"
	10229	Lock Washer, 3/8"
5.	A5420	Auger, L.H. Side, 110 3/4", 12 Row 30
	A5421	Auger, L.H. Side, 121 1/2", 12 Row 36
	A5422	Auger, L.H. Side, 131 1/2",12 Row 38
	A5423	Auger, L.H. Side, 170 3/4", 16 Row 30
6.	10023	HHCS, 1/4"-20 x 3/4"
	10227	Lock Washer, 1/4"
7.	A5409	Auger Tube, L.H. Side, 113 1/4", 12 Row 30
	A5413	Auger Tube, L.H. Side, 124", 12 Row 36
	A5415	Auger Tube, L.H. Side, 134", 12 Row 38
	A5411	Auger Tube, L.H. Side, 173 1/4", 16 Row 30
8.	D1060	Hinge
9.	10064	HHCS, 1/4"-20 x 1"
	10227	Lock Washer, 1/4"
	10103	Hex Nut, 1/4"-20
10.	A4444	Lid
11.	A5405	Mount
12.	D1134	U-Bolt, 7" x 5" x 5/8"-11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8"-11
13.	A4005	Wheel W/Bearing(2 Used Per Mount)
14.	10033	HHCS, 1/2"-13 x 3 1/2"
	10111	Lock Nut, 1/2"-13
15.	D6115	Boot
16.	10009	HHCS, 5/8"-11 x 2 1/2"
	10217	Washer, 5/8" USS
	10107	Lock Nut, 5/8"-11
17.	A5412	Auger Tube, Center, 118 1/2", 12 Row 30 and 16 Row 30
	A5417	Auger Tube, Center, 157", 12 Row 36/38
18.	A5424	Auger, Center, 115 3/4", 12 Row 30 and 16 Row 30
	A5425	Auger, Center, 154 1/4", 12 Row 36/38
19.	A5408	Auger Tube, R.H. Side, 104 1/4", 12 Row 30
	A5414	Auger Tube, R.H. Side, 115", 12 Row 36
	A5416	Auger Tube, R.H. Side, 125", 12 Row 38
	A5410	Auger Tube, R.H. Side, 164 1/4", 16 Row 30
20.	A5426	Auger, R.H. Side, 96 1/4", 12 Row 30
	A5427	Auger, R.H. Side, 106 3/4", 12 Row 36
	A5440	Auger, R.H. Side, 115 1/4", 12 Row 38
	A5441	Auger, R.H. Side, 156 1/4", 16 Row 30
21.	A5373	End Shield
22.	10023	HHCS, 1/4"-20 x 3/4"
	10227	Lock Washer, 1/4"
	10103	Hex Nut, 1/4"-20
23.	A5407	Mount
24.	10460	Cotter Pin, 1/4" x 2"
25.	A5442	U-Joint
26.	7100-103	Decal, Danger
27.	7100-104	Decal, Kinze
28.	7100-115	Decal, Caution

LIQUID FERTILIZER SQUEEZE PUMP
Used On 12 Row Model



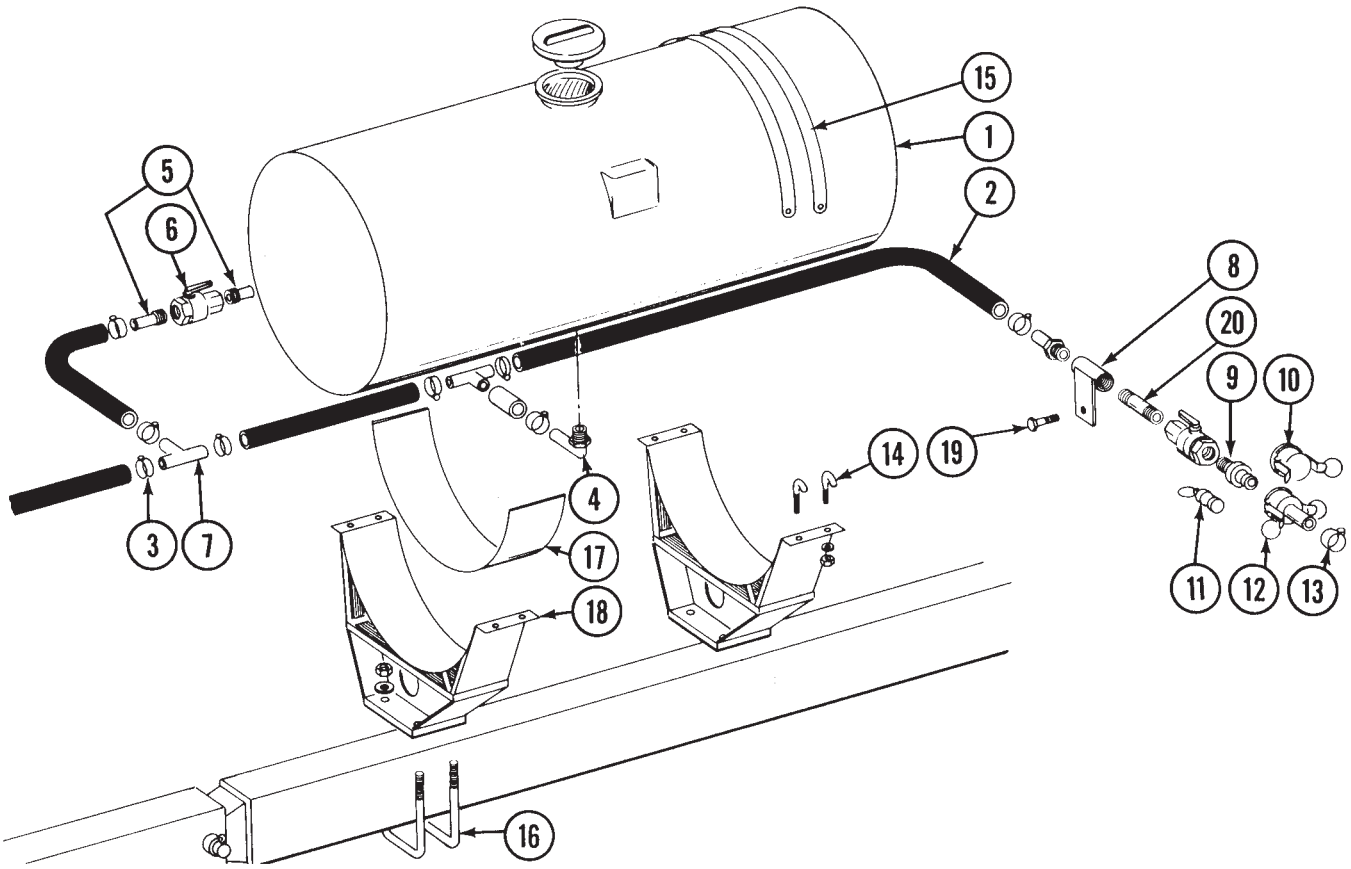
ITEM	PART NO.	DESCRIPTION
1.	R0216	Spring Anchor Bar
2.	10130	Square Head Machine Bolt, 5/16" - 18 x 1 3/4"
	10219	Washer, 5/16" USS
	10144	Wing Nut, 5/16" - 18
3.	R0214	Spring
4.	R0212	Plate
5.	R0208	Frame
6.	R0225	Shim, 1/32"
7.	R0226	Shim, 3/64"
8.	R0210	Shaft
9.	10303	Round Head Machine Bolt, 5/16" - 18 x 1"
	10219	Washer, 5/16" USS
	10144	Wing Nut, 5/16" - 18
10.	R0215	Metering Hose, 1/2" x 13"
11.	R0207	Bushing, Nylon
12.	R0233	Roller
13.	R0231	Roller Arm
14.	10640	Grease Fitting, 1/4" - 28
15.	10131	Set Screw, 5/16" - 18 x 3/4"
16.	10681	Clamp, No. 6
17.	10004	HHCS, 3/8" - 16 x 1 1/4"
	10101	Hex Nut, 3/8" - 16
18.	R0213	Base Angle
19.	R0232	Hose Adapter
20.	R0217	Manifold Plug
21.	R0228	Intake Manifold
22.	R0211	Rubber Cap
23.	R0229	Washer, Nylon
24.	R0230	Bearing, Roller
25.	R0224	Discharge Manifold
26.	10681	Clamp, No. 6
27.	4300-11	Hose, 1/2" x 90'
A.	A0322	Squeeze Pump Complete, 6 Rows

LIQUID FERTILZER SQUEEZE PUMP
Used On 16 Row Model



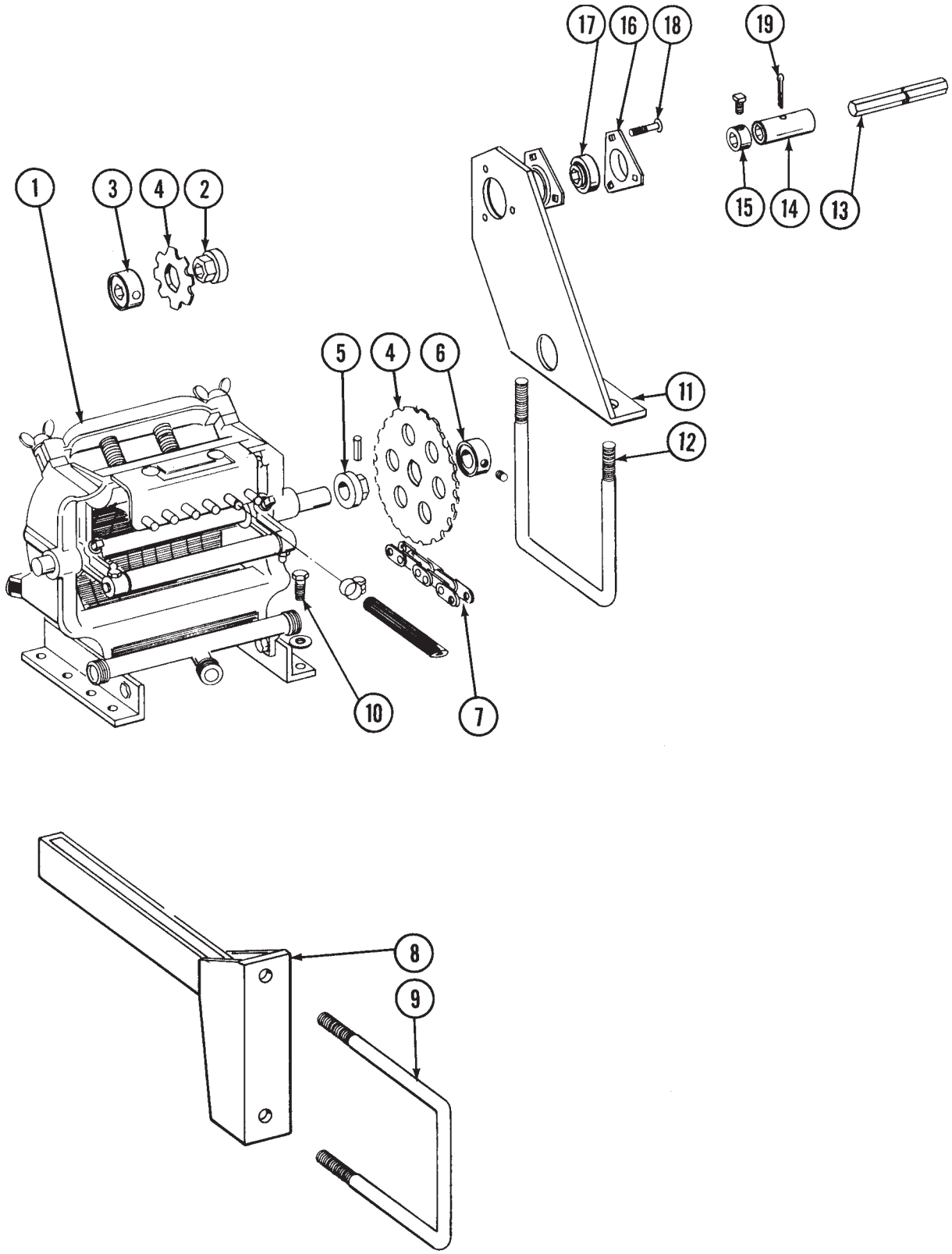
ITEM	PART NO.	DESCRIPTION
1.	R0221	Spring Anchor Bar
2.	10130	Square Head Machine Bolt, 5/16" - 18 x 1 3/4"
	10219	Flat Washer, 5/16"
	10144	Wing Nut, 5/16" - 18
3.	R0214	Spring
4.	R0212	Plate
5.	R0222	Frame
6.	10303	Round Head Machine Bolt, 5/16" - 18 x 1"
	10219	Washer, 5/16" USS
	10144	Wing Nut, 5/16" - 18
7.	R0215	Metering Hose, 1/2" x 13"
8.	R0207	Bushing, Nylon
9.	R0225	Shim, 1/32"
10.	R0226	Shim, 3/64"
11.	R0220	Shaft
12.	R0281	Back Up Roller
13.	R0282	Set Collar
14.	R0283	Roller
15.	R0231	Roller Arm
16.	10640	Grease Fitting, 1/4" - 28
17.	10131	Set Screw, 5/16" - 18 x 3/4"
18.	R0211	Rubber Cap
19.	R0230	Bearing
20.	R0229	Washer, Nylon
21.	R0232	Hose Adapter
22.	10681	Clamp, No. 6
23.	R0279	Base Angle, Left
	R0280	Base Angle, Right
24.	10004	HHCS, 3/8" - 16 x 1 1/4"
	10101	Hex Nut, 3/8" - 16
25.	R0217	Manifold Plug
26.	R0284	Intake Manifold
27.	R0236	Discharge Manifold
28.	10681	Clamp, No. 6
29.	4300-5	Hose, 1/2" x 100'
A.	A0323	Squeeze Pump Complete, 8 Rows

LIQUID FERTILIZER TANKS, SADDLES, HOSES AND FITTINGS



ITEM	PART NO.	DESCRIPTION
1.	A2203	Tank w/Lid and 1 1/4" Pipe Outlet, 24" x 110 Gal.
	D2728	1 1/4" Pipe Outlet
	D1340	Lid, 5", w/Splash Guard
2.	4200-05	Hose, 1 1/4" x 50', 16 Row 30
	4200-06	Hose, 1 1/4" x 40', 12 Row 30 and Wide
3.	10674	Clamp, No. 24
4.	10742	Elbow 90°, 1 1/4" NPT to 1 1/4" Barb
5.	10745	Adapter, 1 1/4" NPT to 1 1/4" Barb Fitting
6.	A0499	Ball Valve, 1 1/4" Nylon
7.	10750	Tee, 1 1/4", Plastic
8.	A0918	Mount
9.	D1514	Q Cam, 1 1/4"
10.	D1515	Dust Cap, 1 1/4"
11.	D1517	Dust Plug
12.	D1516	QCHB, 1 1/2"
13.	10672	Clamp, No. 28
14.	D1337	J-Bolt, 5/16"
	10109	**Lock Nut, 5/16" - 18**
15.	D1335	Tank Band, 24"
16.	D1134	U-Bolt, 7" x 5" x 5/8" - 11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
17.	D1334	Pad, 4" Wide x 14'
18.	A3635	Saddle, 24"
19.	10017	HHCS, 1/2" - 13 x 1 1/2"
	10228	Lock Washer, 1/2"
	10102	Hex Nut, 1/2" - 13
20.	10094	Pipe Nipple, 1 1/4" x 3"

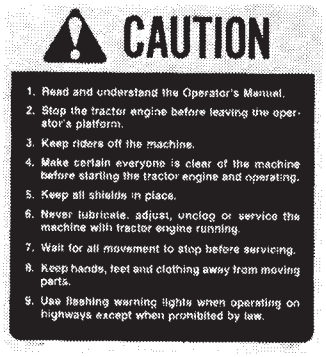
SQUEEZE PUMP MOUNTING BRACKET, SPROCKET AND ADAPTER PACKAGE AND DRIVE LINE



SQUEEZE PUMP MOUNTING BRACKET, SPROCKET AND ADAPTER PACKAGE AND DRIVE LINE

ITEM	PART NO.	DESCRIPTION
1.	A0322	Squeeze Pump, 6 Rows, Used on 12 Row Models
	A0323	Squeeze Pump, 8 Rows, Used on 16 Row Models
2.	A2354	Adapter w/Set Screws
	10120	Set Screw, 3/8" - 16 x 1/2"
3.	A2355	Lock Collar w/Set Screws
	10120	Set Screw, 3/8" - 16 x 1/2"
4.	D1217	Sprocket, 8 Tooth
	D1218	Sprocket, 9 Tooth
	D1219	Sprocket, 10 Tooth
	D1220	Sprocket, 15 Tooth
	D1221	Sprocket, 22 Tooth
	D1222	Sprocket, 23 Tooth
	D1223	Sprocket, 26 Tooth
	D1225	Sprocket, 31 Tooth
5.	D1216	Adapter (Less Roll Pin) w/Set Screws
	10600	Roll Pin, 5/16" x 2 1/4"
	10120	Set Screw, 3/8" - 16 x 1/2"
6.	D1215	Lock Collar w/Set Screws
	10120	Set Screw, 3/8" - 16 x 1/2"
7.	3300-54	Chain, No. 2040, 54 Pitch, Including Connector link
	R0194	Connector Link, No. 2040
8.	A2793	Mount
9.	D1113	U-Bolt, 5" x 7" x 5/8" - 11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
10.	10067	HHCS, 7/16" - 14 x 3"
	10081	Washer, 7/16" USS
	10237	Lock Washer, 7/16"
	10100	Hex Nut, 7/16" - 14
11.	A1784	Bracket (Shown)
	A2721	Bracket
12.	D1134	U-Bolt, 7" x 5" x 5/8" - 11
	10230	Lock Washer, 5/8"
	10104	Hex Nut, 5/8" - 11
13.	D0914-28	Shaft, 7/8" Hex, 12 Row 30
	D0914-35	Shaft, 7/8" Hex, 12 Row Wide
	D0914-58	Shaft, 7/8" Hex, 16 Row 30
14.	D4749	Coupler, 1 3/4"
15.	D0917	Lock Collar, Less Set Screws
	10145	Set Screws, 5/16" - 18 x 1/2"
16.	3400-1	Flangette
17.	2100-3	Bearing, 7/8" Hex
18.	10303	Carriage Bolt, 5/16" - 18 x 1"
	10232	Lock Washer, 5/16"
	10106	Hex Nut, 5/16" - 18
19.	10463	Cotter Pin, 1/4" x 1 1/2"
A.	6485X	Sprocket and Adapter Package, Includes: (1) 10600, (1) D1215, (1) D1216, (1) D1217, (1) D1218, (1) D1219, (1) D1220, (1) D1221, (1) D1222, (1) D1223, (1) D1225, (1) A2354 and (1) A2355

DECALS, REFLECTORS AND TIE STRAPS



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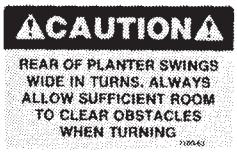
KINZE®

4 Twin • Line



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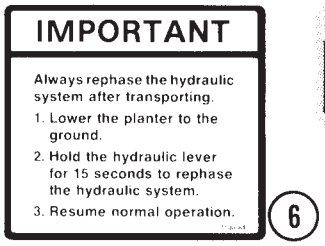

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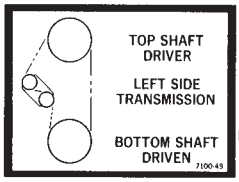

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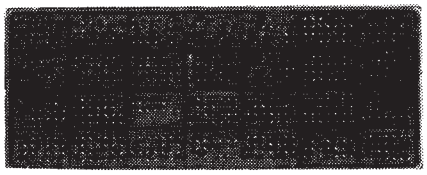

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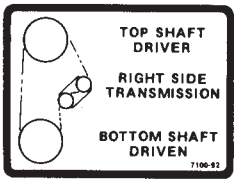

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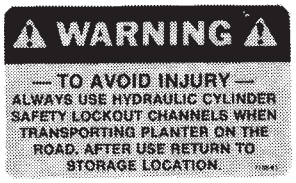

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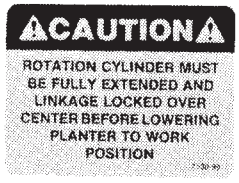

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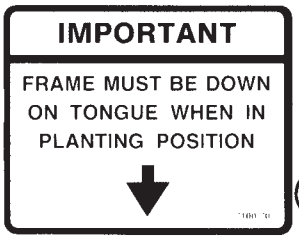
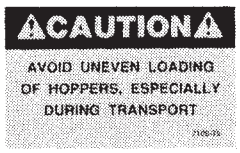
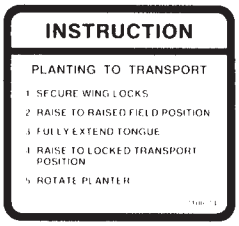


14



15

16



17

21

18

19

DECALS, REFLECTORS AND TIE STRAPS

ITEM	PART NO.	DESCRIPTION
1.	7100-46	Decal, Caution
2.	7100-56	Decal, Caution
3.	7100-54	Decal, Kinze
4.	7100-65	Decal, Twin-Line
5.	7100-63	Decal, Caution
6.	7100-64	Decal, Important
7.	7100-42	Decal, Warning
8.	7100-49	Decal, Transmission, L.H.
9.	7100-92	Decal, Transmission, R.H.
10.	7100-83	Decal, Warning
11.	7200-3	Reflector, Red
	7200-4	Reflector, Amber
12.	7100-68	Decal, Warning
13.	7100-69	Decal, Caution
14.	7100-70	Decal, Note
15.	7100-75	Decal, Caution
16.	7100-73	Decal, Transport to Planting
17.	7100-74	Decal, Planting To Transport
18.	7100-90	Decal, Warning
19.	D1512	Tie Strap, 7"
	D2117	Tie Strap, 14 1/2"
	D1162	Tie Strap, 28"
	D2984	Tie Strap, 33"
20.	R0155	Blue Paint, Aerosol
	R0439	Blue Paint, Quart
	R0440	Blue Paint, Gallon
		(Not Shown)
21.	7100-89	Decal, Danger

NUMERICAL INDEX

Part No.	Page
A0151	P23
A0167	P24
A0238	10
A0243	P24
A0245	P24
A0257	P24
A0261L	P17
A0261R	P17
A0289	P45, P51
A0308	P49
A0312	P49
A0318	P49
A0320	P49
A0322	P55, P59
A0323	P56, P59
A0328	P49
A0376	P17
A0378	P17
A0499	P57
A0503	19
A0513	P8, P9
A0785	P49
A0810	P49
A0865	P8, P9
A0866	P8, P9
A0867	P8, P9
A0895	p13
A0899	P24
A0918	P57
A0941	P2
A1000	P27, P31
A1003	P27, P31
A1015	P25, P27
A1021	P28, P32
A1031	P28, P32
A1033	P25
A1044	P27, P31
A1049	P27, P31
A1076	P25, P27, P29, P31
A1082	P25, P29, P32
A1083	P27, P31
A1084	P28, P32
A1085	P27, P28, P31, P32
A1087	P25, P27
A1092	P25, P27, P29, P31
A1097	P25
A1132	P27, P31
A1133	P27, P31
A1134	P27, P31
A1137	P27, P31
A1138	P27, P31
A1139	P28, P32
A1140	P28, P32
A1142	P28
A1143	P28, P32
A1144	P27, P31
A1147	P28
A1235	P8, P9
A1295	P10
A1308	P10
A1309	P10
A1322	P10
A1369	P49
A1404	P28, P32
A1406	P28
A1409	P28, P32
A1416	P28, P32
A1417	P28
A1418	P32
A1668	P19
A1676	P24
A1677	P24
A1678	P24
A1679	P24
A1720	P21, P47
A1782	P45
A1784	P45, P51, P59
A1786	P19, P51
A2056	P20, P21, P47
A2068	P15
A2101	P54
A2148	P13
A2180	P20, P47
A2203	P57
A2354	P59
A2355	P59
A2484	P36
A2508	P7
A2520	P7
A2526	P38
A2528	P38
A2565	P3
A2566	P7
A2567	P7
A2573	P7
A2581	P5
A2582	P5
A2583	P6
A2584	P6
A2592	P7
A2596	P2
A2597	P3
A2600	P3
A2612	P38
A2614	P7
A2615	P5
A2620	P4
A2621	P4
A2627	P3
A2628	P3
A2645	P28, P32
A2653	P2
A2657	P28, P32
A2694	P5
A2696	P5
A2721	P45, P51, P59
A2736	P5
A2737	P3
A2749	P3
A2761	P53
A2766	P21
A2775	P5
A2783	P5
A2793	P59
A2807	P3
A2808	P38
A2816	P3
A2901	P38
A2908	P13
A2913	P23
A2997	P5
A3042	P37
A3094	P7
A3096	P4
A3100	P28
A3105	P25
A3106	P29
A3107	P29, P31
A3108	P25
A3109	P28
A3400	P4
A3401	P20
A3402	P20
A3403	P11
A3404	P7, P11
A3405	P29, P35
A3407	P36
A3413	P36
A3419	P19
A3420	P19
A3421	P20
A3422	P21, P39
A3428	P19
A3429	P4
A3430	P42
A3437	P39
A3440	P39
A3441	P39
A3442	P39
A3443	P39
A3444	P40
A3445	P40
A3446	P40
A3447	P43
A3448	P42
A3449	P40
A3450	P40
A3451	P40
A3456	P40
A3461	P42
A3462	P41
A3464	P41
A3466	P8
A3469	P43
A3470	P43
A3472	P7
A3473	P42
A3474	P41
A3475	P41
A3477	P42
A3483	P3
A3484	P3
A3488	P42
A3489	P3
A3491	P38
A3492	P38
A3494	P38
A3495	P38
A3496	P38
A3498	P7
A3500	P3
A3501	P3
A3504	P7
A3508	P4
A3509	P12
A3510	P12
A3518	P38
A3521	P13
A3527	P16, P17
A3528	P16, P17
A3532	P11, P12
A3535	P11, P12
A3542	P23
A3545	P23
A3551	P15
A3553	P15
A3554	P15
A3558	P15
A3559	P15
A3563	P15
A3564	P15
A3568	P8, P9, P10
A3570	P15
A3572	P22
A3574	P22
A3575	P22
A3576	P3
A3579	P10
A3584	P38
A3589	P38
A3593	P23
A3594	P23
A3599	P53
A3601	P45, P51
A3602	P45, P51
A3605	P45, P51
A3606	P45, P51
A3612	P51
A3613	P51
A3617	P47
A3621	P52
A3622	P52
A3623	P52
A3624	P52
A3627	P53
A3629	P18
A3635	P57
A3646	P47
A3647	P47
A3652	P21
A3654	P53
A3655	P53
A3665	P49
A3666	P49
A3671	P3
A3672	P41
A3673	P41
A3710	P17
A3726	P11
A3727	P11
A3730	P4
A3731	P11
A3732	P11
A3736	P3
A3737	P3
A3744	P7
A3749	P4
A3750	P38
A3751	P38
A3760	P23
A3762	P23
A3763	P9
A3767	P53
A3768	P53
A3769	P53
A3770	P53
A3933	P38
A4053	P16, P17
A4054	P16, P17
B0123	P3
B0134	P49
B0138	P51

NUMERICAL INDEX

Part No.	Page
D0453-04	P23
D0453-05	P23
D0487	P49
D0558	P2
D0652	P23
D0737	P23
D0746	P24
D0826	P23
D0840	P24
D0914-105	P20
D0914-12.25	P21, P47
D0914-138	P20
D914-28	P59
D0914-35	P59
D0914-58	P59
D0914-63	P21
D0914-79	P20, P21
D0914-95	P20
D0916	P15
D0917	P20, P21, P45, P47, P51, P59,
D0962	P49
D1022L	P52
D1026	P20, P21, P47
D1030	P49
D1065	P20, P21, P47
D1067	P18, P19, P45, P51
D1068	P20, P21, P47
D1111	P16, P17
D1113	P19, P59
D1114	P21
D1132	P49
D1134	P45, P51, P57, P59
D1162	P61
D1166	P8, P9, P10, P13
D1199-06	P18
D1200	P54
D1202	P54
D1203	P54
D1204	P54
D1205	P54
D1206	P54
D1207	P54
D1208	P54
D1209	P54
D1210	P54
D1212	P54
D1213	P54
D1215	P59
D1216	P59
D1217	P59
D1218	P59
D1219	P59
D1220	P59
D1221	P59
D1222	P59
D1223	P59
D1225	P59
D1255	P17
D1256	P17
D1334	P20, P57
D1335	P57
D1337	P57
D1339	P49
D1340	P57
D1354	P9
D1379	P54
D1380	P54
D1512	P61
D1514	P57
D1515	P57
D1516	P57
D1517	P57
D1657	P49
D1673	P49
D1701	P4, P5
D1707	P11, P12
D1741	P8, P9
D1747	P52
D1797	P49
D1966	P8, P9, P10
D2117	P61
D2134	P20, P21, P47
D2168	P3
D2298	P52
D2310	P10
D2357	P7
D2495	P19
D2548-112	P47
D2548-117.5	P47
D2548-153.5	P47
D2548-16	P45, P51
D2548-35	P47
D2548-42.5	P47
D2548-45	P47
D2548-47.5	P47
D2548-52.5	P47
D2548-57.5	P47
D2548-93.5	P47
D2551	P15
D2558	P16, P17, P18, P19, P45, P51
D2589	P49
D2597	P24
D2648	P13
D2707	P16
D2721	P23
D2728	P57
D2768	P53
D2829	P38
D2971-01	P7
D2971-03	P7
D2984	P61
D3237	P7
D3238	P7
D3239	P7
D3275	P7
D3302	P7
D3389	P7
D3394	P6
D3398	P7
D3403	P6
D3404	P7
D3421	P5
D3443	P7
D3452	P7
D3478	P2
D3488	P3
D3501	P2
D3526	P4
D3527	P7
D3531	P4
D3537-01	P2
D3547	P3
D3548	P2
D3550	P2
D3552	P3
D3560	P3
D3561	P2
D3606	P5
D3633	P3
D3637	P3, P7
D3660-08	P15
D3708	P54
D3709	P54
D3710	P4
D3711	P7
D3724	P33
D3751	P7
D3773	P5
D3788-01	P3
D3790	P54
D3791	P15
D3797	P3
D3816	P38
D3856	P3
D3860	P38
D3887	P21, P47
D4086	P25, P27, P29, P31, P32
D4108	P4
D4171	P4
D4432	P35
D4467	P7
D4468	P7
D4473	P34
D4474	P34
D4476	P54
D4477	P54
D4498	P11, P12
D4499	P11, P12
D4509	P39
D4512	P11, P12
D4521	P39
D4522-01	P39
D4523	P39
D4524	P39
D4525	P40
D4526	P40
D4527	P40
D4528	P40
D4541	P42
D4542	P42
D4552	P43
D4553	P43
D4558	P41
D4559	P41
D4560	P42
D4561	P42
D4563	P38
D4564	P38
D4565	P38
D4569-01	P41
D4672	P16
D4695	P3
D4696	P16, P17
D4700	P15
D4701	P15
D4712	P17
D4721	P22
D4724	P23
D4732	P22
D4743	P11, P12
D4748	P19, P45
D4749	P19, P45, P51, P59
D4756	P16, P17
D4762	P45, 51
D4773	P18
D4775	P47
D4781	P52
D4782	P52
D4805	P15
D4811	P52
D4873	P17
D4882	P15
D4883	P15
D4887-01	P17
D4922	P57
D4962	P47
D4969	P47
D5212	P19, P45
D5214	P51
D5215	P19, P45
D5218	P51
D5453	P16
D5469	P16

NUMERICAL INDEX

Part No.	Page
R0150	P24
R0151	P24
R0155	P61
R0189	P10
R0193	P11, P12, P42
R0194	P18, P19, P45, P51, P59
R0195	P15
R0196	P20, P21, P47
R0199	P45
R0201	P20, P21, P47
R0207	P55, P56
R0208	P55
R0210	P55
R0211	P55, P56
R0212	P55, P56
R0213	P55
R0214	P55, P56
R0215	P55, P56
R0216	P55
R0217	P55, P56
R0220	P56
R0221	P56
R0222	P56
R0224	P55
R0225	P55, P56
R0226	P55. P56
R0228	P55
R0229	P55, P56
R0230	P55, P56
R0231	P55, P56
R0232	P55, P56
R0233	P55
R0236	R56
R0270	P8, P9, P13
R0279	P56
R0280	P56
R0281	P56
R0282	P56
R0283	P56
R0284	P56
R0296	P8, P9
R0374	P42
R0375	P11, P12, P42
R0434	P13
R0439	P61
R0440	P61
R0515	P2
R0516	P2
R0517	P2
R0522	P8, P9
R0528	P10
R0529	P10
R0531	P10
R0719	P37
R0720	P37
R0760	P36
R0761	P36
R0762	P36
R0763	P36
R0764	P36
R0777	P39
R0778	P39
R0784	P40
R0790	P40
R0791	P42
R0792	P43
R0793	P43
R0794	P42
R0795	P41
R0807	P38
R0848	P37
R0849	P37

Part No.	Page
IK139	P49
IK148	P16, P17
10001	P3, P20, P21, P47
10003	P3, P16, P17
10004	P55, P56
10005	P3
10007	P2, P6, P47, P52
10008	P15, P23
10012	P45, P51
10014	P2, P3
10016	P2, P7
10017	P33, P53, P57
10019	P19, P45, P49, P51
10025	P7
10026	P8, P9, P10
10033	P24
10036	P9, P18
10037	P53
10039	P11, P12
10045	P49
10046	P49
10050	P3
10051	P15
10053	P15, P16, P17
10061	P20, P21, P35, P47
10067	P59
10076	P3
10081	P59
10082	P7, P10
10083	P8, P9
10084	P8, P9
10087	P13, P41, P43
10094	P57
10099	P15
10100	P59
10101	P16, P17, P19, P20, P21, P47, P49, P51, P55, P56
10102	P2, P3, P11, P12, P15, P23, P24, P33, P45, P49, P51, P53, P57
10104	P3, P6, P9, P18, P19, P20, P21, P23, P45, P47, P51, P52, P57, P59
10105	P3, P8, P9, P10, P11, P12, P52
10106	P16, P17, P18, P45, P51, P54, P57, P59
10107	P15, P49
10108	P3, P7
10109	P19, P45, P49, P51
10111	P2, P4, P5, P7, P11, P12, P16, P17, P49
10117	P3, P7
10118	P3, P7
10120	P59
10130	P55, P56
10131	P56
10133	P49, P54
10139	P3, P7
10144	P55, P56
10145	P20, P21, P45, P47, P51, P59
10146	P10
10157	P2
10159	P16, P17
10166	P15
10168	P24
10169	P2
10171	P54
10189	P40
10201	P54
10204	P49
10205	P15
10206	P11, P12, P15, P53
10210	P20, P21, P47, P49, P51
10213	P49
10216	P3, P22, P45, P49, P51
10217	P3, P45, P51
10219	P54, P55, P56
10226	P11, P12, P23
10228	P2, P3, P7, P11, P12, P15, P23, P24, P33, P45, P49, P53, P57
10229	P16, P17, P19, P20, P21, P34, P35, P47, P49, P51
10230	P2, P3, P6, P9, P18, P19, P20, P21, P23, P45, P47, P51, P52, P57, P59

Part No.	Page
10231	P3, P7, P8, P9, P10, P52, P55
10232	P16, P17, P18, P45, P49, P51, P54, P57, P59
10233	P15, P16, P17, P18, P19, P20, P45, P51
10234	P5
10237	P59
10264	P7
10269	P38
10281	P7
10289	P39
10290	P11, P12
10293	P7
10303	P16, P17, P18, P54, P55, P56, P59
10305	P49, P51
10313	P45, P51
10324	P42
10325	P3, P7, P34
10326	P34
10329	P13
10330	P13
10332	P6, P7
10333	P7
10335	P15, P22
10336	P5
10338	P45, P51
10339	P19, P45, P51
10343	P20, P21, P42, P53
10345	P7
10350	P34, P35
10430	P17
10435	P18, P19, P20, P21, P45, P47, P51
10451	P49, P53
10453	P15
10457	P3, P7
10459	P8, P9
10460	P2, P3, P4, P5, P11, P12, P15, P19, P23, P45, P47, P51, P53
10461	P4, P7
10462	P10, P53
10463	P15, P16, P17, P18, P22, P45, P47, P51, P59
10464	P17, P54
10465	P19
10468	P7
10470	P16, P17, P22, P24
10499	P49
10501	P15
10503	P49
10504	P49
10509	P39, P40, P42
10527	P45, P51
12561	P16, P17, P23, P53
10600	P59
10602	P19, P20, P45, P51
10610	P6, P7
10640	P3, P4, P47, P53, P55, P56
10641	P3, P4, P5, P7, P11, P12, P16, P17, P22, P23, P53, P54
10643	P11, P12, P20
10651	P49
10655	P54
10670	P19, P23, P54
10671	P5
10672	P54, P57
10674	P57
10676	P54
10681	P49, P55, P56
10722	P24
10724	P24
10725	P24
10742	P57
10745	P57
10750	P57
2100-03	P15, P16, P17, P18, P19, P45, P51, P59
2404-08-08	P27, P28, P31, P32
2404-10-08	P28, P32
2406-08-06	P27, P31
2406-10-08	P28, P32
2500-03	P51
2500-08-08	P25, P29
2500-12	P51

NUMERICAL INDEX

Part No. Page

2500-14 . . . . P45, P51
2500-16 . . . . P18
2500-18 . . . . P16
2500-19 . . . . P20
2500-21 . . . . P18
2500-25 . . . . P19, P45
2500-26 . . . . P19, P45
2500-27 . . . . P19, P45
2500-28 . . . . P19, P45
2501-06-04 . P27, P28, P31, P32
2501-06-08 . P27, P28, P31, P32
2501-08-08 . P28, P32
2603-08 . . . . P27, P31, P32
2700-08 . . . . P25, P27, P29, P31
2700-10 . . . . P28, P32
306-08 . . . . . P25, P27, P29, P31
306-10 . . . . . P28, P32
3200-46 . . . . P15
3300-06 . . . . P51
3300-32 . . . . P18
3300-40 . . . . P19
3300-49 . . . . P45
3300-52 . . . . P51
3300-54 . . . . P59
3300-62 . . . . P45, P51
3303-131 . . . P20
3303-67 . . . . P21, P47
3309-01 . . . . P15
3309-02 . . . . P15
3400-01 . . . . P16, P17, P18, P45, P51, P59
4200-05 . . . . P57
4200-06 . . . . P57
4300-05 . . . . P56
4300-11 . . . . P55
6156X P49
6400-06-08 . P27, P28, P31, P32
6400-08 . . . . P25, P27, P28, P29, P31, P32
6400-08-10 . P25, P29
6485X P59
6500-06 . . . . P27, P28, P31, P32
6500-08 . . . . P25, P27, P29, P31
6500-10 . . . . P28, P32
6600-08 . . . . P25, P29
6654X P18
6801-08 . . . . P27, P31
7100-42 . . . . P61
7100-46 . . . . P61
7100-49 . . . . P61
7100-54 . . . . P61
7100-56 . . . . P61
7100-63 . . . . P61
7100-64 . . . . P61
7100-65 . . . . P61
7100-68 . . . . P61
7100-69 . . . . P61
7100-70 . . . . P61
7100-73 . . . . P61
7100-74 . . . . P61
7100-75 . . . . P61
7100-83 . . . . P61
7100-89 . . . . P61
7100-90 . . . . P61
7100-92 . . . . P61
7200-03 . . . . P61
7200-04 . . . . P61